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Better Prospects Before Market

Large Equipment Programs for Railroads Are in Sight—Japanese Buying Now in Considerable Tonnage—September Bookings Below Expectations but Ahead of August—Pig Iron Production Declines for Fourth Consecutive Month

REVIVAL of steel buying on a broad scale has not yet made its appearance but the market continues to exhibit the evidence of sound underlying conditions. With the pressure lifted from demand by the present easiness of deliveries and with more accommodating mill schedules, consumers are able to move with deliberation in meeting their requirements. Here and there, however, signs of real betterment are shown. Stocks with a number of consumers apparently are reaching the spot where they demand replenishment and considerable new miscellaneous tonnage is attributed to that source. September business while not up to expectations for all producers was not discouraging. Its distribution was uneven but on the whole it was ahead of that of August. The Steel corporation mills profited best from the new tonnage in September, some of them exhibiting gains of 50 per cent over August.

Preliminary inquiries for tin plate for 1924 are developing and these indicate the mills will be hard put to supply the expected requirements at least for the first quarter and half. Not much new buying is coming from the automobile industry but in northern Ohio one lot of 6000 tons of bars from this source was placed this week. For two lake ore boats placed by the Ford Motor Co., the Carnegie Steel Co. will supply 10,000 tons of steel.

Many Cars in Sight

Expectations of better buying of steel in the near future, in a considerable degree are based upon the possibility of a revival of railroad equipment orders on a heavy scale. From several reliable sources comes the information that large purchasing programs are being prepared for release during the last quarter. Chicago estimates the total of cars which may be placed this quarter at 75,000. New York advices put it considerably higher. The Union Pacific and the Southern Pacific each have a program of 18,000 cars while a contemplated purchase of 10,000 to 15,000 cars is attributed to the Pennsylvania railroad.

Rail buying by the railroads keeps up well. New orders include 50,000 tons for the Baltimore & Ohio, 30,000 tons for the Chesapeake & Ohio, 5400 tons for the Hocking Valley and 2500 tons for the Clover Leaf. The 100,000 to 125,000 tons for the Pennsylvania and the 25,000 tons for the Reading still are to be placed. The Missouri Pacific wants 30,000 tons.

Japan Buys Tonnages

Japanese buying especially in sheets is beginning to appear in a tonnage way and this may help the sluggish market in that product. One maker has just sold to Japan 12,000 to 15,000 tons of black, galvanized and electrical sheets. The Japanese government has suspended the import duty on sheets and structural steel and through the department of commerce is endeavoring to line up 60,000 tons of galvanized sheets. Two inquiries for wire nails total 12,000 tons.

IRON TRADE REVIEW composite of fourteen leading iron and steel products still points downward largely because of the receding pig iron market. This week it is $44.23 against $44.47 last week.

Weakness in pig iron continues unchecked and has had the effect of causing buyers to hold off so that selling is lighter. More merchant furnaces are preparing to blow out. Basic has been sold at $24 valley and as low as $22 has been named on certain stocks. Valley foundry iron is lower. It is reported $23 has been named on Buffalo iron and $20.50 Birmingham on southern. Merchant iron producers in Alabama are reducing furnace and mine labor to equalize their costs with the declining market for iron. Eastern iron has dropped 25 to 75 cents and Lake Superior charcoal is off $2.

Iron Output Still Down

For the fourth consecutive month pig iron production fell off in September and now is practically back to the January rate. The total output for the 30 days in September was 3,123,611 tons against 3,448,886 tons for the 31 days in August, a reduction of 325,275 tons. The average daily rate of 104,120 tons in September was 6.4 per cent under that of 111,254 tons in August and was 16.5 per cent down from the high point in May. Since May a loss of 65 active furnaces has been sustained making the total at the end of September 257 compared with 270 in August, a drop of 11 stacks.

Business Trend and Chart Section Page 939

Pig Iron Prices Are Cut Again

Decline Is Widespread as Buyers Continue To Hold Out—Valley Quotation $24 to $24.50—Buffalo Tonnage Reported Available at $23—Cleveland Off 50 Cents—Basic Down to $24—Trading Light

PITTSBURGH, Oct. 3.—Price declines in various grades of pig iron are in order and buyers are deferring action on contemplated purchases until some kind of concessions are made. Users are not actively issuing inquiries although the Mesta Machine Co. now is taking quotations on between 700 and 800 tons of foundry iron for October-November. Occasionally buyers like the Standard Sanitary Mfg. Co., the Westinghouse Electric & Mfg. Co. or the National Malleable Castings Co., come into the market for fair-sized lots but their general run of consumers is buying at a hand-to-mouth basis. A sanitary ware manufacturer is understood to have closed on 2750 tons last week on the basis of $24.50, valley, for No. 2 foundry. This tonnage was divided among at least three producers, one in northern Ohio receiving 1250 tons and two other valley makers receiving 750 tons each. From $24 to $24.50, valley, now is quoted on the No. 2 grade. The Westinghouse Electric & Mfg. Co. closed on about 3000 tons for Cleveland at $24.50, delivered, from a nearby furnace. On approximately 3000 tons, Trafford City, Pa., received some attractively low quotations from middle interests but in large part it chose to pay a trifle more to producers. One bidder received 1500 tons of different foundry grades around $24.50, furnace, for No. 2 grade with the same freight rate as from the valley. Another producer took 200 tons of high silicon at $25.50, delivered, while a middle interest booked a larger tonnage of No. 2 and No. 3 iron to come from a valley furnace at $24.50, delivered, for No. 2. Bessemer has dropped 50 cents to $26 valley. Merchant producers now are quoting that level on single carloads.

A steel foundry at Vandergrift, Pa., bought 250 tons of resale bessemer through middle interests at $25.25, valley, and one or two other users have purchased small lots, same source, at a similar figure. Basic has declined $1, to $24, valley, although a quotation of $22 on certain stocks of basic, f.o.b. a Pennsylvania furnace, with a lower freight rate to Pittsburgh common points than from the Mahoning valley failed to interest prospective buyers. It develops the recent purchase of the National Malleable Castings Co., Sharon, Pa., was on the basis of $24, delivered, on a 50-cent freight rate apparently from a valley steelworks furnace. Average sales prices for September compiled by W. P. Snyder & Co. show $24.50 and $26.50, respectively, on basic and bessemer as against $25 and $26.50, respectively, for August. Interest still is lacking in malleable which now is quotable at $24 to $26, valley, although no doubt large tonnages could be placed at at least 50 cents below the minimum. Gray forge is inactive at $23.50 to $24, valley. Low phoshorus is quoted at $28, Lebanon or $32.66, delivered Pittsburgh,

Extended Statistics of American Iron and Steel Production and Ingot and Casting Output, page 984

and at $30 to $31, valley, with a $1.77 freight rate to Pittsburgh.

Iron Imported From India

Boston, Oct. 2.—Pig iron prices continue to weaken in the New England market and buying for the last quarter is delayed. One eastern Pennsylvania furnace has come into the market during the last few days with a base price of $24.50, plus 50-cent silicon differentials. This means that the grade used most in New England, No. 2X (2.25 to 2.75 silicon) can be obtained at $25, furnace, or $28.65, delivered. Buffalo interests have been quoting $24 for the base grade, and undoubtedly a round tonnage would command this same figure for the No. 2X grade, which means $28.92 delivered. A sale of 100 tons of iron from India has been made to an eastern Massachusetts consumer at $24.65, duty paid, Boston. It is understood that this is for guaranteed analysis No. 1X iron, (2.75 to 3.25 silicon). A boat with a consignment of pig iron from India is reported on the way to Boston. The Boston district still has in storage several thousand tons of foreign iron which was brought in earlier in the year. Sales during the past week include 500 tons to a textile machinery manufacturer, 300 tons to a Connecticut hardware manufacturer, and several 200-ton lots. Foundry production continues heavy and much fourth quarter buying is in prospect.

Eastern Markets Weak

New York, Oct. 2.—Prices on eastern pig iron are weak. It now is easy to place attractive tonnages of foundry iron at $24, base eastern Pennsylvania furnace, and it is possible to shade this figure. While 50 cents silicon differentials continue the rule, the differentials are waived in some instances on high-silicon iron. Some eastern furnaces are still quoting $25 base, and are booking a little tonnage at this figure. On Buffalo foundry the market also has declined and Buffalo iron has sold at $23.50, base furnace, and it is believed this figure could be shaded. Virginia foundry iron has been sold at $24 base furnace, plus silicon differential. Due to the declining prices a number of operators are talking about blowing out furnaces in the near future. In the meantime demand here continues fair. Sales in this territory during the past week aggregated fully 8000 tons, and orders for at least 10,000 to 12,000 tons now are pending. The Richardson & Boynton Co. has not yet taken any action on its inquiry for 1000 tons of foundry iron for the last quarter and 4000 tons for the first quarter of next year. The Gould Coupler Co. is expected momentarily to close on 1000 to 2000 tons of malleable. The New York Airbrake Co. has bought 2000 tons of foundry iron. The New York Central railroad and the Lackawanna railroad have closed for round tonnages of foundry iron. The General Electric Co. has bought some high-silicon iron for Pittsfield, Mass., and now is inquiring for a tonnage for Bayway, N. J.

Market Weaker at Buffalo

Buffalo, Oct. 2.—Improved inquiry finds the market weaker. Total inquiry at present amounts to approximately 20,000 tons of malleable and foundry iron. Sales were probably slightly under that figure. One interest sold 10,000 tons in the week. In the aggregate of inquiry were individual lots for 1000 and 2000 tons. Prices show considerable spread. On No. 2 plain, 1.75 to 2.25 silicon the open figures seem about $24 to $24.50. One interest will not take less than $24.50, but on the other hand, some base grade iron has been sold for lower than $24. Some selling at $23.50 has been done and $23 is understood to be available in some quarters.

Prices Lower; Market Weak

Cleveland, Oct. 2.—Pig iron prices this week show a further decline in the territory served by furnaces represented in the northern Ohio group, and trading is of an unsatisfactory character. In Cleveland the open market quotation has been marked down to $25, furnace, for delivery in the 50-cent switching radius, while for beyond this, $24.50 furnace, is the asking price. Additional sales of foundry iron have been made in the week at $24.50 valley basis, and it is understood a large steelworks is offering No. 2 foundry iron at $24, valley. Following sales at $23.50, Buffalo, $23 is reported available, and a seller in competition with that point says the price is wavering at that figure. The Standard Sanitary Mfg. Co. has continued to place business with several producers, the total reported in the last week amounting to about 5000 tons. The price done on most of this is reliably reported as $24.50, valley. The Westinghouse Electric & Mfg. Co. which was inquiring for over 6000 tons has closed for a tonnage for Trafford City, Pa., at $24.50, valley, and for a portion of its requirements for Cleveland. The National Malleable Castings Co. closed for about 500 tons for Indianapolis. The General Electric Co. purchased 1000 tons of foundry iron from one of the interests in the northern Ohio group. With one maker sales in September amounted to one half the total for August. Another made 50,000 tons of iron in September, and

shipped the same amount. A lake producer closed for over 10,000 tons this week, about 6000 tons of which represented renewals, while another merchant interest took 4000 tons. Inquiry runs to about 4000 tons, the largest lot amounting to 1400 tons. The National Malleable Castings Co. closed for about 2500 tons of basic iron at $24, valley, with a valley maker. That this price is the market is further indicated by the fact that another seller took 1500 tons for shipment into the Pittsburgh district at $24, valley.

The Otis Steel Co., Cleveland, expects to blow out one of its furnaces for relining before Nov. 1.

Southern Ohio Market Dull

Cincinnati, Oct. 2.—Pig iron consumers continue their efforts to force down prices without doing much buying and have succeeded progressively in obtaining lower figures, while sellers are not disclosing how far they will yield to meet competition. Hand-to-mouth buying features the market. With shipments arriving on scheduled time, the consumers see no need of buying ahead. The southern Ohio market is quotable at $25, Ironton base, although this price has been shaded from 50 cents to $1 a ton. The recent decline of $2 a ton in southern iron has practically deadened that market, which is quotable at $21 to $23, Birmingham base. There has not been a sale of southern iron of importance in this market for the past ten days. The Tappan Stove Co., Mansfield, O., closed for 200 tons of southern iron and a like tonnage of northern iron. This sale represents the outstanding transaction of the week. The Indianapolis Casting Co. also bought 100 tons of northern iron. Inquiries involve about 700 tons. The Baltimore & Ohio railroad is inquiring for 150 tons of northern iron, while a Michigan stove concern is negotiating for 500 tons of southern iron.

Weakness Causes Hesitation

St. Louis, Oct. 1.—Weakness is the outstanding characteristic of the pig iron market in this district. Southern iron is freely offered at $21 base, and while the standard grade is still quoted at $26 Chicago, it is known that this figure has been shaded. The leading local producer has cut its quotation from $29 at $29 to $26.50 at $27.50, f.o.b. Granite City. At the present differential Southern furnaces have immensely the best of it in this territory. Birmingham iron at $23 and Chicago at $26 represent a parity on delivery price in St. Louis, while now the Birmingham base is $21 and the Chicago price $26. In Kansas City, southern iron can be had at $2.29 less than the northern product. Figuring in the barge and rail rate, southern iron can enter the Chicago territory at a slight advantage in price to buyers over iron turned out by the Chicago stacks.

The sharp price cuts have failed thus far to stimulate purchasing. On the contrary the element of uncertainty has been emphasized, and melters are disposed to hold off. This attitude, however, is believed to be only temporary, for as there is still much iron to be bought for the near future. The largest single sale reported was 300 to an Illinois foundry, and 200 tons went to another melter in the sale vicinity. An East Side steel plant is understood to

(*Concluded on Page* 918)

Furnace Coke Sells at $4

Connellsville Market Continues To Weaken, and More Ovens Are Likely To Be Taken Off—Buyers Still Wait

COKE PRICES, PAGE 919

Pittsburgh, Oct. 2.—Beehive furnace coke has declined another 25 cents, having touched $4 in the spot market. Users who indicated they would be interested in coke at $4 still defer action. The Pittsburgh Steel Co., Wheeling Steel Corp. and other consumers continue their policy of buying from time to time. The Inland Steel Co. bought late last week 50 carloads of standard Connellsville coke at $4, ovens, since which time it is reported that one other blast furnace operator has been able to close up his October requirements at slightly below $4 with a large coke producer who required the tonnage to keep his ovens operating for another month. In the absence of definite details regarding this transaction, the market is quotable at $4 to $4.25, ovens. A few producers contemplate being able to run for a month or two and are planning to buy 50 to 100 carloads at a time in the market as needed. It is possible that additional ovens will be put out, and in this way the decline in the market checked. It is understood that one operator with about 300 ovens active out of 1000 intends to become entirely idle at an early date, while others are planning to put out 50 or 100 ovens at a time and thus bring output more nearly in line with consumption. On contracts some producers still are asking as high as $4.50, but no coke is moving at that figure. Medium sulphur or heating coke is selling this week at $3.25 to $3.40, one recent sale of this grade involving about 1500 tons, between those two levels. Inquiries now out are few and far between. Some selected 72-hour foundry coke likewise is lower by at least 25 cents, going to $5 to $5.75, ovens. This is the range of the regular run of foundry coke brands. The better ones bring $5.50 or $5.75. Medium coke still commands a higher figure, one order being refused by a maker on the buyer's offer of $7.25 for that particular kind of coke. Small lots alone figure in the current trading. Production, according to the *Connellsville Courier*, for the week ended Sept. 22 was 236,000 tons as against 239,580 tons for the week ended Sept. 15.

Prices in East Are Lower

New York, Oct. 2.—Coke prices have reflected more weakness in the past few days. Some special brands still are bringing $6.75 to $7, Connellsville, but it is not difficult to purchase standard foundry fuel for spot shipment at anywhere between $4.75 to $5.25, Connellsville. Eastern blast furnaces have purchased spot furnace coke at $4 and $4.25, Connellsville. Medium sulphur furnace coke ranging from 1.50 to 2 per cent in sulphur has been quoted as low as $3.25, Connellsville. The Seaboard By-Products Coke Co. has not followed the general tendency toward lower prices. It continues to quote $11.34 to $11.52, delivered at Newark and other northern New Jersey points.

Detroit Demand Larger

Detroit, Oct. 2.—The movement of by-product coke at this point continues in liberal volume. The price still is $12, ovens. The movement to Canada has declined, but this is offset by the domestic demand which is showing a marked increase.

Cincinnati Sales Small

Cincinnati, Oct. 2.—Sales of coke in this territory are not brisk, but inquiries for small lots are fairly numerous. The situation as a whole is somewhat easier than a few weeks ago. Demand for domestic coke has slackened, owing to the warm weather of the past 10 days, but sellers firmly believe that interest in the market will return with cooler weather. Connellsville coke also is less active, and a number of sellers are anxious to book contracts and are asking prices from $5.50 to $6.25 on the foundry grade for shipment over the remainder of this year. A number of these contracts are pending. By-product cokemakers announced there would be no change in their quotations for October, Ashland Solway and Terre Haute remaining at $9, Connellsville base, with the Indianapolis fuel holding at $13.40, Indianapolis delivered. Wise county furnace coke has advanced 50 cents a ton, despite light demand for that grade. Pocahontas coke producers are practically sold up to Nov. 1, while New River ovens have slightly more coke to offer than a week ago.

By-Product Stocks

St. Louis, Oct. 1.—Except for a better demand for domestic sizes, the coke situation remains unchanged. By-product plants which continue to operate at or near capacity are beginning to acquire large stocks. Prices however are steady, and no change is looked for in the near future. Shipments to industrial users are in large volume, and some improvement in the demand from the West and Southwest is noted. The market for foundry coke is dull and featureless. Melters have provided for their immediate needs, and are not stocking to any extent. Southern ovens are offering small quantities in this market slightly under what can be done on eastern coke. Shipments from Connellsville and other eastern fields are coming through with regularity, and some requests have been made to extend deliveries.

Production Keeps Up

Birmingham, Ala., Oct. 1.—Although the coke market is weak there has been no curtailment of the production. Some good contracts are in hand, and the spot business coming in keeps the producers in a hopeful spirit. Quotations for foundry coke are around $7.50, and for the furnace grade under $7. Foundries are buying for immediate needs only.

Abraham Kamberg, Springfield, Mass., has been named receiver for the Palmer Foundry & Machine Co., Palmer, Mass. He filed a bond of $10,000.

Pig Iron Prices Are Cut

(*Concluded from Page* 917)

have purchased 5000 tons of basic from a leading Chicago furnace. The price was the lowest of the year for basic.

Wage Readjustment Is Begun

Birmingham, Ala., Oct. 1—Sales of pig iron show no improvement, the aggregate still being under production in the South. Readjustment of wages in ore and coal mining and furnace labor is said to be imperative, in view of the reduced price of iron which is down $7 per ton while wages have blown out during the next few days.

Chicago Market Quiet

Chicago, Oct. 2.—Spot buying of pig iron is only sufficient to replace the melt and to keep stocks down to a three weeks' supply. Some sales have been made for the first quarter by foundries having castings booked. Southern Iron is weaker. It is rumored some has been offered ot $20.50, Birmingham, and some off grade iron tendered at $20. Several sales of 100 to 250 tons of northern iron have been made to northern Illinois melters. A southern Wisconsin melter is inquiring for 1000 tons of southern is that to stabilize the market the blowing out of at least one or two merchant furnaces is needed. At least two important makers now are considering taking such action. The principal business here in the week involved at least 8000 tons of steelmaking iron. Basic now is quoted at $24.50 to $25, delivered to eastern consuming points. Copper-bearing, low phosphorus iron continues firm at $28, furnace. Included in low phosphorus business of the past week is 150 tons for the government, placed with the Bethlehem Steel Corp., for shipment to Washington, at $28, furnace. English copper-free, low phosphorus iron

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	Oct. 3, 1923	Sept. 1923	July 1923	Oct. 1922
PIG IRON				
Bessemer, valley del., Pitts....	$27.77	28.27	28.52	35.12
Basic, valley	24.00	25.00	25.15	30.60
Basic, eastern del., eastern Pa..	24.75	25.10	27.25	30.25
*No. 2 foundry, del. Pitts....	26.27	26.52	27.37	33.62
*No. 2 foundry, Chicago.....	26.00	26.75	28.00	31.75
*Southern No. 2, Birmingham..	21.00	22.75	25.00	27.40
*Southern Ohio, No. 2, Ironton.	24.50	24.90	26.50	32.40
**No. 2X, Virginia furnace	25.50	25.50	27.25	33.00
**No. 2X, eastern del., Phila..	25.26	26.21	28.00	33.00
Malleable, valley	24.00	24.60	25.50	32.30
Malleable, Chicago.....	26.00	26.75	28.00	31.75
Lake Superior charcoal, Chicago	30.04	32.04	36.65	36.15
Gray forge, val. del. Pittsburgh	25.27	26.27	27.02	33.27
Ferromanganese, del. Pitts.....	111.79	114.79	122.29	105.47
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh.	42.50	42.50	42.50	39.85
Sheet bars, open-hearth, Pitts....	42.50	42.50	42.50	39.85
Billets, bessemer, Pittsburgh ...	41.50	42.50	42.50	40.00
billets, open-hearth, Pittsburgh..	41.50	42.50	42.50	40.00
FINISHED MATERIAL				
Steel bars, Pittsburgh.....	2.40	2.40	2.40	2.00
Steel bars, Chicago.....	2.50	2.50	2.50	2.00
Steel bars, Philadelphia.....	2.72	2.72	2.72	2.325

	Oct. 3. 1923	Sept. 1923	July 1923	Oct. 1922
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia.....	$2.67	2.72	2.72	2.325
Iron bars, Chicago mills.....	2.35	2.38	2.55	2.50
Beams, Pittsburgh.....	2.50	2.50	2.50	2.00
Beams, Philadelphia	2.72	2.82	2.82	2.325
Beams, Chicago	2.60	2.60	2.60	2.10
Tank plates, Pittsburgh.....	2.50	2.50	2.50	2.05
Tank plates, Philadelphia	2.72	2.82	2.82	2.425
Tank plates, Chicago.....	2.60	2.60	2.60	2.10
Sheets, blk., No. 28, Pittsburgh.	3.75	3.75	3.85	3.50
Sheets, blue anl., No. 10, Pitts.	3.00	3.00	3.00	2.60
Sheets, galv., No. 28, Pittsburgh.	5.00	5.00	5.00	4.50
Wire nails, Pittsburgh.....	3.00	3.00	3.00	2.70
COKE				
Connellsville furnace.....	4.00	4.55	4.35	10.60
Connellsville foundry, ovens.....	5.00	5.70	5.15	12.10
OLD MATERIAL				
Heavy melting steel, Pittsburgh.	16.50	18.00	18.25	21.35
Heavy melting steel, eastern Pa.	16.25	16.85	17.25	18.00
Heavy melting steel, Chicago..	15.00	16.55	17.10	18.50
No. 1 wrought, eastern Pa....	18.50	19.00	18.85	22.50
No. 1 wrought, Chicago.....	16.25	18.25	16.60	20.40
Rails for rolling, Chicago	17.00	18.30	18.40	20.50

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon

Composite Market Average

Representing the Combined Average Prices per Ton of Fourteen Leading Iron and Steel Products Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago

Oct. 3, 1923	Sept. 26, 1923	September, 1923	July, 1923	October, 1922	October, 1913
$44.23	$44.47	$44.64	$45.39	$43.60	$24.91

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

remained around the recent peaks.

The Woodward Iron Co., has started on a program of readjustment of wages, labor of the iron ore miners of the company accepting the cut.

While the open market price is given at $23 and $24 No. 2 foundry, sales are being heard of in the Middle West at $21 and $21.50 per ton. Surplus stocks of iron in Alabama show a decided increase. Estimate places the amount of iron on yards at 115,000 tons and more, despite the fact that the Alabama Co., the Gulf States Steel Co., and another small furnace interest have moved some of their stocks. The surplus stock also increased despite the blowing out of four blast furnaces.

The local consumption is showing no letup. Two more furnaces may be foundry iron. A Chicago melter is asking for 400 to 500 tons of low phosphorus iron. Some pig iron has been sold nearby at a price figuring back to $25, Chicago, but this is done to equalize freight, and $26 continues to be market. It is reported another stack in the Chicago district may blow out. Charcoal iron is down $2 to $27, furnace, but there is no selling. Low phosphorus iron still is $34, eastern furnace. Jackson county silvery iron is $34.50 for 8 per cent.

Basic Sold in East

Philadelphia, Oct. 2.—Pig iron trading is somewhat better, but still considerably less than what is needed to make furnaces feel comfortable. Producers are restless, and the price situation is weak. The general view here continues obtainable at $28.50 to $29, duty paid, tidewater, for early shipment. Gray forge iron sold at $25 delivered. Attractive foundry orders are going at $24, furnace, plus 50-cent silicon differentials. Indications are that a lower price could be done. On the other hand, some sales continue to be made at $25, base furnace. Virginia consumers in the past week bought at least 3000 tons of Virginia foundry iron at $25, base furnace, which now seems the minimum, although in some instances silicon differentials are waived. The Baltimore & Ohio railroad wants 300 tons of foundry iron and a Philadelphia consumer 500 tons of basic. Several inquiries are out involving moderate lots of foundry and malleable. Domestic copper-free, low-phosphorus iron is unchanged.

Iron and Steel Prices

SCRAP PRICES, PAGE 990, WAREHOUSE PAGE 982, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 986

Pig Iron

Bessemer, valley	$26.00
Bessemer, Pittsburgh	27.77
Basic, valley	24.00
Basic, Pittsburgh	25.77
Basic, Buffalo	24.00 to 24.50
Basic, del., eastern Pa.	24.50 to 25.00
Malleable, valley	24.00 to 26.00
Malleable, Pittsburgh	25.77 to 27.77
Malleable, Chicago	26.00
Malleable, Buffalo	23.50 to 24.50
Malleable, del., eastern Pa.	25.25 to 26.25

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.23
No. 2 Southern foundry	1.75 to 2.25
No. 2X Eastern and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	25.76 to 26.26
No. 1X, Buffalo	24.50 to 25.00
No. 2 foundry, valley	24.00 to 24.50
No. 2 foundry, Pittsburgh	25.77 to 26.27
No. 2 foundry, Buffalo	23.50 to 24.50
No. 2 foundry, Chicago	26.00
No. 2 foundry, Granite City	26.50 to 27.50
No. 2 foundry, Ironton fur.	24.50 to 26.00
No. 2 foundry, Cleveland, del.	25.50
No. 2 foundry, del., Phila.	24.76 to 25.26
No. 2 foundry, N. J. tidewater	25.39 to 26.13
No. 2X, eastern del., Phila.	25.26 to 25.76
No. 2X, east. N. J. tidewater	25.89 to 26.63
No. 2X, eastern del. Boston	28.65 to 29.15
No. 2X foundry, Buffalo, fur.	24.00 to 24.50
No. 2X, Buffalo, del. Boston	29.92 to 30.42
No. 2 southern, Birmingham	21.00 to 23.00
No. 2, southern, Cincinnati	25.05 to 27.05
No. 2 southern, Chicago	27.01 to 29.01
No. 2 southern, Philadelphia	28.80 to 30.80
No. 2 southern, Cleveland	27.01 to 29.01
No. 2 southern, Boston (rail and water)	27.91 to 29.91
No. 2 southern, St. Louis	26.17 to 27.17
No. 2X, Virginia furnace	25.00 to 25.50
No. 2X, Virginia, Phila.	30.27 to 30.77
No. 2X, Virginia, Jersey City	30.54 to 31.04
No. 2X, Virginia, Boston	31.42 to 31.92
Gray forge, eastern Pa.	25.00
Gray forge, val. del., Pitts.	25.27 to 25.77
Low phos., standard, valley	30.00 to 31.00
Low phos., standard, Phila.	30.00 to 32.00
Low phos., Lebanon furnace	28.00
†Low phos. English, delivered Phila. territory	29.26 to 30.64
Charcoal, Birmingham	33.00
Charcoal, Superior, Chicago	30.04

Silvery Iron

Jackson County, Ohio, furnace

7 to 8 per cent	$33.00
8 to 9 per cent	34.50
9 to 10 per cent	36.50
10 to 11 per cent	38.50
11 to 12 per cent	41.00
12 per cent	43.50

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	$43.50
11 to 12 per cent	46.00
12 to 13 per cent	48.50

Ferroalloys

†Ferromanganese 78 to 82 per cent, tidewater, or furnace first hand and resale	$107.00 to 117.50
Ferromanganese, delivered, Pittsburgh	111.75 to 122.29
Spiegeleisen 19 to 21 per cent furnace or tidewater	40.00 to 47.00
Ferrosilicon, 50 per cent contract freight allowed	82.50
Ferrotungsten standard, per pound contained	88.00 to 90.00
Ferrochrome, 60 to 70 chromium, 4 to 6 carbon per pound contained, delivered	12.00
Imported ferrochrome, 4 to 6 per cent carbon	nominal

†Duty paid.

Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.50
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

Coke

Beehive, Ovens

Connellsville furnace	$4.00 to 4.25
Connellsville foundry	5.00 to 5.75
New River furnace	8.00 to 9.00
New River foundry	11.50 to 12.00
Wise county furnace	5.50 to 6.00
Wise county foundry	6.50 to 7.00
Alabama furnace	6.50 to 7.00
Alabama foundry	7.25 to 7.50

By-Product

Foundry, Newark, N. J., del.	$11.34 to 11.52
Foundry, Chicago, ovens	13.50
Foundry, Boston, delivered	13.50
Foundry, Granite City, Ill.	13.00
Foundry, Alabama	7.25 to 7.50

Semifinished Material

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$40.00 to 42.50
Open-hearth, Youngstown	40.00 to 42.50
Open-hearth, Philadelphia	46.67 to 47.67
Bessemer, Pittsburgh	40.00 to 42.50
Bessemer, Youngstown	40.00 to 42.50
Forging, Pittsburgh	47.50
Forging, Philadelphia	51.67 to 52.67

SHEET BARS

Open-hearth, Pittsburgh	$42.50
Open hearth, Youngstown	42.50
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50

SLABS

Pittsburgh	$40.00 to $42.50
Youngstown	40.00 to 42.50

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh, $51.00

Standard extras, $2.50 per ton over ¼-inch; $5 for screw stock; $15 for acid wire rods. Carbon extras, $3 for 0.20 to 0.40; $5 for 0.41 to 0.55; $7.50 for 0.56 to 0.75; $10 over 0.75.

SKELP

Grooved skelp, Pittsburgh	2.40c
Universal skelp, Pittsburgh	2.40c
Sheared skelp, Pittsburgh	2.40c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.50c
Structural shapes, Phila.	2.67c to 2.82c
Structural shapes, New York	2.69c to 2.84c
Structural shapes, Chicago	2.60c
Tank plates, Pittsburgh	2.50c
Tank plates, Philadelphia	2.72c to 2.82c
Tank plates, New York	2.74c to 2.84c
Tank plates, Chicago	2.60c
Bars, soft steel, Pittsburgh	2.40c
Bars, soft steel, Philadelphia	2.72c
Bars, soft steel, New York	2.74c
Bars, soft steel, Chicago	2.50c
Bars, refined iron, Pittsburgh	3.25c to 5.00c
Bars, rail steel, Chicago	2.30c
Reinforcing bars, Pittsburgh	2.20c to 2.40c
Bar iron, common, Phila.	2.67c to 2.72c
Bar iron, common, New York	2.69c to 2.74c
Bar iron, common, Chicago	2.35c to 2.40c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Hoops, Pittsburgh, large	3.00c to 3.15c
Hoops, Pittsburgh, small	3.50c
Bands, Pittsburgh	3.00c to 3.15c
Cold finished steel bars, Pittsburgh base	3.25c
Steel shafting, Pittsburgh	3.25c
Cotton ties, bundle 45 lb. Pittsburgh	$1.64

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	30.00 to 35.00
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.15c to 2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.15c
Spikes, small railroad, Pitts.	3.50c
Spikes, boat and barge, Pitts.	3.50c
Spikes, railroad, Chicago	3.25c
Track bolts, Pitts. Standard	4.00c
Track bolts, Pitts., small	4.75c to 5.00c
Track bolts, Chicago	4.25c
Tie plates, Pittsburgh	2.60c
Tie plates, Chicago	2.60c

Spike, tie plate and truck bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Wire nails, Pittsburgh	3.00c
Galv'd nails, 1-inch and over	5.25c
Plain wire, Pittsburgh	2.75c
Annealed wire, Pittsburgh	2.90c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c
Barbed wire, painted, Pitts.	3.45c
Barbed wire, galv., Pitts.	3.80c
Polished staples Pittsburgh	3.45c
Galvanized staples Pittsburgh	3.80c
Coated nails, count keg, Pittsburgh	2.70c
Woven wire fencing (retailers)	65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Chain, 1-in. proof coil, Pitts.	6.50c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburgh stamping quality	3.00c to 3.15c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, 0.100-inch and heavier, base	5.00c

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	3.75c to 3.85c
No. 28, bessemer, Pitts.	3.75c to 3.85c
No. 28, open-hearth, Phila.	4.07c to 4.17c
No. 28, open-hearth, Chicago	4.09c to 4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.85c
No. 28, open-hearth, Chicago	3.84c

GALVANIZED

No. 28, open-hearth, Pitts.	5.00c
No. 28 bessemer, Pittsburgh	5.00c
No. 28, open-hearth, Phila.	5.32c
No. 28, open-hearth, Chicago	5.34c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	3.00c
No. 10 bessemer, Pittsburgh	3.00c
No. 10, open-hearth, Phila.	3.32c
No. 10, open-hearth, Chicago	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c

Tin Plate

Per 100 lb. box

Tin plate, coke base, Pitts.	$5.50

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	62	50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Class B Pipe

Four-inch, Chicago	63.20 to 65.20
Six-inch and over, Chicago	58.20 to 60.20
Three-inch, Birmingham	59.00 to 60.00
Four-inch, Birmingham	53.00 to 54.00
Six-inch and over, Birmingham	49.00 to 50.00
Four-inch, New York	68.60
Six-inch and over, New York	63.60

Standard fittings, Birmingham, base, $110.00

6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $5 higher than Class B.

Scrap Prices Drop Again

Few Grades Remain at Previous Levels as Buyers Show Hesitation to Replenish Stocks—Railroad Offerings Heavy

SCRAP PRICES, PAGE 990

Chicago, Oct. 2.—Chicago scrap prices have been marked down in every instance except iron car wheels, some of the decreases reaching $2 per ton. Scrap is coming out fairly well. Foundry buying has tapered off, most melters being uncertain of the future and hesitant to cover more than their immediate requirements. The St. Paul railroad has put out a list of 1225 tons, the Burlington railroad a list of 5700 tons, including 700 tons of sheet scrap, the Pennsylvania, Northwestern region, 2600 tons, Pennsylvania, Southwestern region, 7500 tons, while the New York Central and Michigan Central each has put out a blind list.

Cast Grades Still Firm

Boston, Oct. 2.—Prices held firm during the past week in the iron and steel scrap market in New England. Inquiry for cast grades is more pronounced and several fair sized orders of No. 1 machinery have been placed. Heavy melting steel is bringing $13 on cars at point of delivery. The large dealers claim $12.50 as the outside price. Blast furnace borings and turnings have sold at $9.50. Firmness in the cast grades is surprising in the face of the drop in pig iron prices. Textile machinery scrap has sold at $24 delivered and pig iron is offered at $28 delivered.

Market Continues Dull

New York, Oct. 2.—Continued dullness has resulted in the prices of several grades of iron and steel scrap being reduced. No. 1 heavy melting steel is off $1, now holding at $12 to $12.50, f. o. b. New York, with No. 1 railroad steel down to a range of $12.75 to $17. Wrought pipe is off $1, dealers quoting $11.25 to $11.75, f. o. b. New York, and downward revisions are also noted in heavy and machinery cast, and in shafting. The leading eastern Pennsylvania consumer of heavy melting steel has reduced its offerings for the better grades from $16.50, delivered, to $16. Borings and turnings are in sluggish demand, but prices remain nominally unchanged.

Market Is Weaker

Buffalo, Oct. 2.—The iron and steel scrap market is weaker and while mills are not entirely out of the market, buying has been reduced to a minimum. Consumers are cutting down open-hearth operation and what buying is taking place is of the hand-to-mouth variety. Heavy melting steel is now quotable at $17 to $17.50 and other grades have weakened perceptibly.

Consumers Refuse to Buy

Pittsburgh, Oct. 2.—Iron and steel scrap consumers refuse to buy additional supplies, and there is no market at all in either iron or scrap metal. Prices are weak, several grades being marked down from 50 cents to $2 per ton from the levels prevailing one week ago. While one interest has been paying $17 for heavy melting steel on tonnages reaching its track over and above the amount specified on its orders, nobody will pay any higher and dealers today are offering no more than $16.50, and the market cannot be quoted at above $16.50 to $17. The Weirton, W. Va., embargo has been removed but the consumer there is undertaking no new buying at present. Other embargoes still are in force in the Pittsburgh area and avenues for the disposal of scrap are few and far between.

Prices Continue Downward

Cleveland, Oct. 2.—Iron and steel scrap prices continue their downward movement. Consumer buying is of little moment although some new tonnage is being taken, particularly for blast furnace use. Deliveries on contract are going forward without interruption, few holdup orders existing. Quotations have been cut 25 cents to $1 a ton through practically the entire list. Heavy melting steel now is cents; machine shop turnings, $12 to $12.25, down 50 cents; cast iron borings, $12.50 to $13, down 25 cents; hydraulic compressed sheets, $13.75 to $14, a drop of 75 cents.

Prices Off 50 Cents

Cincinnati, Oct. 2.—With prices the lowest they have been in a year, the local iron and steel scrap market again is off about 50 cents on all grades with the exception of stove plate, busheling and iron rails. Hand-to-mouth buying with some dealers eager for business is contributing to the continued weakness. The heavy offerings of the railroads also is a factor in that connection. The general trend of the market is downward and as a result there is less speculative buying on the part of dealers. Not much change in existing conditions is looked for before next month. Most users are well supplied for the next 30 days. Offerings from railroads continue heavy and they are accepting much lower prices for their lists than a month ago.

Scrap Buying Light

Detroit, Oct. 2.—Owing to the lack of mill buying scrap prices have become nominal with the tendency weak. Dealers say mills report they are well supplied with scrap. There is some interyard buying to piece out contracts, but such sales are usually under the average market. Movement of hydraulic compressed sheets has been of fair volume although the price has receded $1.50 a ton in recent weeks. Prices in the main are off 50 cents a ton from a week ago. An upturn in scrap prices is forcasted for this month, by several dealers.

Railroad Offerings Flood Market

St. Louis, Oct. 1.—A deluge of railroad offerings, coupled with the drop in pig iron prices and slow buying by consumers gave the market for iron and steel scrap a decidedly bearish aspect during the final week of September. There have been numerous requests to delay deliveries on material contracted for and a growth in cancellations. Malleable grades are dull and lower. Foundry grades are comparatively firmer than other varieties, but the break in pig iron has had a tendency to create an easier feeling in that material.

Yard stocks are beginning to augment under heavy deliveries by the railroads. The carriers are pouring in cars from all directions. This influx of scrap has become burdensome and difficult to digest. Rails for rolling are plentiful, and in poor demand and the same is true of steel scrap, including specialties. On top of this situation the roads have offered additional heavy tonnages.

Market Continues Quiet

Birmingham, Ala., Oct. 2.—Scrap iron and steel market in the South continues quiet with no indications of an early recovery. Considerable tonnage of old material is moving yet and will through the balance of the year. Heavy melting steel shows no signs of improvement in the near future. All dealers in old material have plenty of stock on yards.

Tendency to Weakness Exists

Philadelphia, Oct. 2.—The iron and steel scrap market here is tending to weaken further as a result of but little buying by consumers during the past week. Bethlehem Steel Corp. took considerable steel scrap but outside of this the market was dull. Most of the trading now is done between brokers. Prices have been revised downward again.

Better Inquiry

Appears for Ferromanganese and Market Is Firmer

FERROALLOY PRICES, PAGE 919

New York, Oct. 2.—Inquiry for ferromanganese has improved materially and consumers now are asking prices altogether on at least 1000 tons. This represented the largest tonnage on which prices have been taken for some months past. The tone of the market is somewhat firmer. Importers have been instructed by their principals to continue quoting $117.40 duty paid tidewater on English ferromanganese. The resale market on the basis of recent business continues to be quoted at $108 to $110. However, resale stocks appear to have shrunk to a considerable extent. Some merchants who recently have made resales report that they now have no resale lots to offer.

Business in spiegeleisen reported here during the past week has not involved very much tonnage. The market on spiegeleisen may be quoted at all the way from $40 to $45, furnace on round tonnages of 20 per cent metal.

Prices of all the special ferroalloys are unchanged, with the markets featureless. Shipments on old contracts for 50 per cent ferrosilicon and ferrochrome are going forward at a good rate, but new business is slow in all lines. Ferrovanadium is an exception, as some good sized automotive orders have been placed recently.

Less Resale Offered

Pittsburgh, Oct. 2.—Fewer offerings of resale ferroalloys, particularly ferro-

manganese, are reported by sellers of domestic material. It would appear that since a fairly large aggregate tonnage has been bought at $109, or a little lower, during the past two weeks, only a little more of this material is available. Confirming this situation is the fact that orders have come to first hands during the past two or three days for a total of at least 250 tons at the full $110 seaboard base, figure. Three or four new inquiries now out for small lots include carloads or 100 tons at a time, and buyers find the market slightly stronger since the resale offerings are not now so insistent.

Spiegeleisen is weak, small concessions having been made on several small lots recently. One furnace, however, continues to quote unchanged prices, $45 furnace, on the 19 to 21 per cent material, and $1 less on 16 to 19 per cent. Small inquiries up to 100 tons at a time continue to come out.

All other alloys are dull although some activity in ferrochrome is understood to have appeared in the east. One sale of 100 tons of 11 per cent ferrosilicon is noted at $45, Pittsburgh. One or two inquiries, mostly single carloads of this commodity, now are out.

Spiegel Lower at Chicago

Chicago, Oct. 2.—Spiegeleisen is weaker with a quotation of $47.50, delivered. Sales total about 100 tons. Ferromanganese is slightly stiffer at $110, seaboard. It is believed purchases could be made at this figure only with difficulty. Most resale metal has been disposed of.

Resales Absorb Business

Philadelphia, Oct. 2.—While ferromanganese inquiry is better, most of it is not developing into sales. Such buying as now is being done is being satisfied as a rule by resale material which appears to be sufficiently plentiful to satisfy the present limited demands. This metal is going at around $107 to $110, duty paid tidewater. The Dunbar, Pa., furnace now making spiegeleisen will blow out in about a week. The current spiegeleisen market is quotable at $40 to $45 furnace for 20 per cent with little business reported.

Strip Buying Reduced

Pittsburgh, Oct. 2.—Confronted by a reduced buying rate, makers of both hot and cold-rolled strip steel still are able to operate at a fairly high rate because of the good condition of their order books. Operations average around 80 per cent of capacity. The price of 5.00c, base Pittsburgh, on cold-rolled strips is stronger than the 3.15c base Pittsburgh level on hot-rolled. When 3.00c is named on the latter, however, it usually applies to hot strips for cold rolling. Auto parts makers and other manufacturing lines are represented in the limited new buying. Some have contracted for their fourth quarter supplies; others are holding off and buying from month to month or on a hand-to-mouth basis.

The Milwaukee Stamping Co., Milwaukee, with works at West Allis, has increased its common stock from $500,000 to $600,000 to handle the enlarged volume of its business.

Semifinished Trade Is Dull

Sheet Bars Still Selling at $42.50 in Limited Quantities—Buyers Holding Off Though Stocks Are Low

SEMIFINISHED STEEL PRICES, PAGE 919

Pittsburgh, Oct. 2.—Notwithstanding the intermittent sales of semifinished material in the three chief forms, sheet bars, billets and slabs, the market is dull. Customers are not buying far ahead, usually in 500 to 1000-ton lots, although over the past two or three weeks a few 5000-ton lots have been noted. These for the most part have been at $42.50, Pittsburgh or Youngstown, although on billets and slabs as low at $40 has been done. In sheet bars, some concessions in the way of freight equalizations have been made, such as a Pittsburgh mill selling to a user in the Youngstown territory on the basis of $42.50, Youngstown, to meet competition of the Mahoning valley producers. Efforts of buyers here to find a $40 price on sheet bars, however, have failed and on attractive specifications $42.50 has been paid by interests which made every effort to develop the $40 figure. That is the only level named in connection with any inquiries that come out from week to week. On the limited amounts of forging billet business pending, $47.50, Pittsburgh, has been quoted. No sales are noted. One or two wire rod inquiries are out in addition to a few from abroad, including some from Japan. Wire rods continue to be quoted at $51, Pittsburgh. Skelp has no market at 2.40c, no inquiries being out and no recent sales being recorded.

Billets $41.50 in East

Philadelphia, Oct. 2.—Several billet sales in this district in the past week aggregated over 1000 tons. This business generally went at $41.50 to $42.50, base Pittsburgh, for the rerolling grade and $46.50 to $47.50 for forging quality. Consumers say that in some instances they purchased off-quality billets at lower prices.

Close for Sheet Bars at $42.50

Youngstown, Oct. 2.—Sales of semifinished material, particularly sheet bars, for last quarter delivery are being closed by producers in this district on the same basis as last quarter, namely, $42.50, Youngstown. Contracts were signed early this week on this basis and in two instances involved 2500 tons. Specifications being issued at present are deficient in volume compared with the business placed at the beginning of last quarter. Late last week a Pittsburgh district consumer purchased a few thousand tons at $42.50, Pittsburgh, the producer absorbing the freight rate. Only where mill schedules are light, however, is there any noticeable effort on the part of semifinished producers to quote under $42.50, Pittsburgh.

Sheet Bars Sold at $42.50

Cleveland, Oct. 2.—The market for sheet bars, billets and slabs in this district remains comparatively quiet, though enough has developed in the past week to make it clear that $42.50, Pittsburgh or Youngstown, O., still represents the market on sheet bars. Investigation fails to indicate that buyers have been able to obtain sheet bars under that figure. A rumor that less than that was done, on being traced to its source, leads to the information that a local consumer placed 3000 tons with a nearby maker for third quarter delivery at $42.50, Youngstown, plus freight of $1.64 per ton, bringing the price delivered here to $44.14. On some sales into the Pittsburgh district the price was $42.50, Pittsburgh, the seller absorbing a freight differential to compete with other mills. Sizable tonnages have been closed by some representative buyers in the past week or 10 days at $42.50, Youngstown. The market for billets does not reflect the same degree of strength as that of sheet bars, and in some cases the differential on small billets over the 4 x 4 size have been waived and both sold on a basis of $42.50, Youngstown. Specifications on contracts for sheet bars, billets and slabs are coming out in good volume, especially from some of the motor car interests.

Demand Continues Good from Warehouses

WAREHOUSE PRICES, PAGE 982

New York, Oct. 2.—Jobbers continue to report a good volume of business, with prices steady on virtually all descriptions of warehouse business. One leading interest reports that business in September fell off from the volume of the preceding month, but so slightly as to be almost negligible.

Conditions Satisfactory

Philadelphia, Oct. 2.—Demand for iron and steel products from warehouses continues at about 70 per cent of normal and jobbers say that underlying conditions are satisfactory. Prices are unchanged.

Demand Well Maintained

Cleveland, Oct. 2.—Demand for iron and steel products from warehouses in this district continues to be well maintained, with some dealers reporting September business at from 25 to 40 per cent above that of August. Although activity was slow for a week here and there during the past two months the general trend since July has been upward, each month showing an increase over the previous one. Dealers feel confident that October business will be maintained at or above September levels. Prices are firm.

Railroad Work Aids Demand

Detroit, Oct. 2.—Trade in iron and steel jobbing circles continues of fair volume, but the grades moving are not as varied as formerly. Some falling off in demand for structural shapes is noted. Sheets are slow, hardly any inquiry being received for them.

Buying by railroad interests of bolts and rivets and bands has been of fair proportion in recent weeks. The large amount of railroad work in this section it is believed will be prominent in this trade for some months. Prices on all grades are unchanged.

Bar Business Is Limited

Mill Backlogs Diminish as Buyers Hesitate To Close on Fourth Quarter Requirements, Although Many Already Are Protected

BAR PRICES, PAGE 919

Chicago, Oct. 2.—Makers of soft steel bars foresee business continuing healthy for the remainder of the year and enough new demand in sight to maintain operations at their present rate for the final quarter. The railroads in the Middle West are handling a record volume of traffic and users of bars generally are cheerful.

In a few isolated instances mill prices have governed the sale of deformed bars. The soft steel bar quotation of 2.50c, Chicago mill, remains firm. Little new business is reported in bar iron, but the aggregate is enough to maintain operations. The quotation on bar iron remains at 2.35c to 2.40c, Chicago mill. The Moline mill has resumed production of rail steel bars with sufficient tonnage to assure a month's operation. The quotation continues at 2.30c, mill.

Fully Covered for Quarter

Pittsburgh, Oct. 2.—Practically all merchant steel bar consumers have fully covered themselves for their fourth quarter needs. In all cases these protections are comparable to the tonnages received by these various customers during the third quarter although it remains to be seen whether the full quota of specifications will be furnished.

The market price here remains unchanged at 2.40c, base Pittsburgh, producers believing that no more than the going tonnage would be bought even should they shade the established market figure. Refined iron bars are unchanged at from 3.25c, base Pittsburgh, upward although more indifference on the part of consumers is encountered.

Auto Builder Buys 6000 Tons

Cleveland, Oct. 2.—Leading interest in the bar market this week has centered in the buying by a large northern Ohio automobile builder against last quarter requirements. This interest placed with Pittsburgh mills approximately 6000 tons of bars for October-November shipment, the bulk of which will be delivered in the former month. Other buying is to be done later by this consumer. Inquiry and new business in steel bars in this territory continue to show some improvement. Orders generally are reported as heavier and buyers are again showing more interest in following up deliveries. Shipments from the larger mills continue reasonably prompt with three to four weeks now promised on many sizes of rounds, flats and squares. Prices on merchant bars are steady at 2.40c, Pittsburgh. In strip steel and bands considerable variations continue to be shown, however.

Closing for Third Quarter

Boston, Oct. 2.—A fairly heavy tonnage of bars was placed during the past week in the closing of third quarter contracts. These were placed at the old schedule of extras. Fourth quarter contracts on the new schedule are developing slowly. Consumers prefer to buy spot tonnage and run the chance that prices will decline rather than contract for the balance of the year at this time. The leading sellers are holding firm at 2.50c, Pittsburgh. Some shading by small makers has recently come to light.

Cold-Drawn Backlogs Slim

Pittsburgh, Oct. 2.—Order backlogs for cold-drawn steel bars have been practically wiped out and producers are hungry for business, manifesting keen desires for orders. So far this has not led to price cuts locally although occasionally one appears in the West or East which, it is claimed, is not met by Pittsburgh district finishers. These latter are maintaining the 3.25c, base Pittsburgh, level. The warehouse price is 4.05c, base Pittsburgh. October business promises to be better than September which was better than August from the standpoint of specifications placed. Many consumers are fully protected for their prospective fourth quarter requirements and to date specifications have been coming in regularly. Operations are on a 60 to 70 per cent basis.

Weakness Still Prevails in Nuts, Bolts and Rivets

NUT AND BOLT PRICES, PAGE 986

Pittsburgh, Oct. 2.—Several small orders are placed each week for nuts, bolts and rivets but the market lacks real life. Prices still are weak but well established. Manufacturers claim to be maintaining the market levels on the basis of 60 and 5 off for large machine bolts. Some makers are understood still to be naming 60 and 10 off, with similar concessions offered on other nuts and bolts. Jobbers lately have been fairly active in ordering for stock in a small way although stocks still are said to be far from normal. On rivets, 3.00c, base Pittsburgh, is the usual market; some manufacturers claim to be maintaining the 3.10c base on orders of a certain size while others are competing for what business is offered on the basis of a 2.90c quotation. With the regular discount of 65 and 5 off on small rivets, some makers find it necessary to quote 65 and 10 off to get a share of the going business.

Requirements Not Covered

Chicago, Oct. 2.—While a fair total of bolt and nut business is on the books of makers here, some users have not yet covered for their full fourth quarter requirements. Third quarter contracts were well specified and a small volume of current buying is being done.

Hoop Orders Still Small

HOOP PRICES, PAGE 919

Pittsburgh, Oct. 2.—Several hundred tons of hoops and bands are bought each week, represented largely by specifications on contracts. Brand new business is slight although from time to time fourth quarter contractial arrangements are made. The buying rate is not what it should be from coopers although users in other lines, chiefly automotive, are fairly active in connection with rimstock purchases at the regular differential of $3 per ton under the base price of 3.15c, Pittsburgh.

American Goods Demand Better in Near East

Washington, Oct. 2.—With the signing of peace in Turkey and consequent opening up of trade in Asia Minor, an improved market for American goods in the Near East is expected by Julian E. Gillespie, trade commissioner of the department of commerce recently returned from Constantinople.

Increased demand for agricultural implements, textiles, all sorts of machinery and manufactured goods may be expected in the trade commissioner's opinion, although no unusual trade revival is sure. The ability of the new nationalist government of Turkey to preserve law and order and to maintain a stable rule is of much importance to the commercial development of the country because of its influence in the matter of obtaining capital.

Mr. Gillespie has returned to the United States to give his information to the department of commerce for the benefit of American trade development in that part of the world. He plans to visit some of the leading cities to talk to American business men about trade possibilities in the Near East.

Takes Over Plant

The American Terry Derrick Co. has been organized as a subsidiary of the American Hoist & Derrick Co., St. Paul, to take over and operate the major portion of the plant properties of the Terry Mfg. Co., at Kearny, N. J. The Terry Mfg. Co. went into receivership about a year ago, and the recent purchase includes not only the greater portion of the property, but also the patterns, designs and good will. Operations at the plant will be confined to the manufacture of derricks. Officers of the new company have not been announced.

The remaining portion of the property, on which there are no buildings, has been purchased by the Public Service Corp., Newark, N. J., and will be used for the transmission lines, which will run from present properties of the Public Service Corp. to its proposed new power plant, to be located in the Kearny Meadows.

Steel Rates Lowered

A new freight rate on iron and steel shipments from Chicago, Gary and other northern points to Indianapolis was announced recently. The new rates, put in force by the Monon and Cincinnati, Indianapolis & Western railroads, are 15½ cents per 100 pounds. The old rates were 25 cents. According to manufacturing authorities, the old rates made it dif-

ficult for local concerns to compete with plants in St. Louis and other cities which had a freight rate on iron and steel from northern points of 17½ cents per 100 pounds.

Caucasian Ore Sold

New York, Oct. 2.—A sale of 10,000 tons of manganese ore has been made during the past week at 39 cents per unit, c.i.f. tidewater, for October and November shipment from the Caucacus. This ore is to contain 48 to 49 per cent manganese. On the washed Caucasian ore, containing 53 to 55 per cent, the market now is 41 to 42 cents. No quotations are heard on Indian or Brazilian manganese ore.

Exports of Wire and Nails Listed by Countries

Washington, Oct. 2.—Japan was the largest importer of iron and steel wire and wire nails from the United States in July, according to figures just issued by the department of commerce. That country took 1662 tons of galvanized wire in addition to 1112 tons of wire nails and 203 tons of plain iron and steel wire in that month.

Following is a list of the principal countries to which the United States exported plain iron or steel wire, galvanized wire, barbed wire and wire nails during the month of July:

Countries	Plain iron or steel wire tons	Galvanized wire tons	Barbed wire tons	Wire nails tons
Canada	419	536	25	49
England	41	15	20	231
Mexico	230	18	567	142
Cuba	86	208	1,496	470
Argentina	362	298	751	28
Brazil	1,111	172	1,012	..
Colombia	1	76	631	13
Peru	9	93	65	126
Uruguay	77	49	60	..
Venezuela	1	12	200	32
China	19	97	..	152
Japan	203	1,662	..	1,112
Philippine Isl.	1	33	111	414
Australia	34	312	1,054	16
British South Africa	4	28	840	37
Chile	495	120	112	38

New Mills Started

Two new sheet mills of the Newton Steel Co. were placed in operation last week, for the first time and the officials plan to get the last unit of its new instaliation under power by the latter part of this week. By the completion of the three new units the number of sheet mills in the Mahoning valley now totals 120 distributed among seven companies, with the Newton Steel Co. now ranking as the second largest producer in that district.

Loadings Again High

Washington, Oct. 2.—Revenue freight car loadings for the week ended Sept. 22 again passed the million mark, a total of 1,060,436 cars being registered, as compared to the 1,060,580 figure for the week preceeding. The empty net car surplus amounted to 45,493 cars, as compared to a net surplus of 5,835 for the week ended Sept. 15.

Plate Buying in Prospect

Some Tonnage Coming Out in Chicago and Cleveland—Eastern Orders Show Slight Improvement—2.40c Available in Certain Districts

PLATE PRICES, PAGE 919

New York, Oct. 2.—Plate buying in the aggregate has been somewhat smaller in this territory and the total probably does not exceed 40 per cent of mill capacity. New demand for plates is about the slowest of the finished steel products in this territory. No large inquiries are before the trade, excepting that of the New York Central railroad. No new oil, tank or shipbuilding work has come out. It is expected, however, that considerable plate tonnage will be involved in car business to be placed in October. While the leading Pittsburgh mills continue to quote 2.50c, base Pittsburgh, it is easy to place attractive tonnages with the eastern makers at 2.40c, base Pittsburgh, equivalent to 2.74c, delivered New York.

Expect Oil Producers' Decision

Chicago, Oct. 2.—The placing of 14,000 tons of plates for oil storage tanks last week appears to have filled the present need, but within the next week or ten days oil producing interests apparently must decide whether to cease drilling operations or to continue and build more tanks. Platemakers in the Chicago district do not look for any cessation of drilling and believe that the remainder of the 50,000 tons of plate business will come out. The plate market continues strong and one maker cannot make delivery before the first quarter. The plate price continues at 2.60c, Chicago mill.

New Business Is Limited

Pittsburgh, Oct. 2.—Little new business is developing in connection with plates. The market price remains firm on the basis of 2.50c, Pittsburgh. Specifications on contracts are fair and one or two fabricators such as the Dravo Contracting Co., have some plate business to place but these state they will await lower market figures. There is a marked disposition on the part of platemakers to hold to the 2.50c level, believing that nothing is to be gained by offering concessions. Additional river craft are up for bids involving plates up to 1000 tons at a time. Bids which closed Sept. 29 on two to six derrick boat hulls for the United States engineers at Louisville, Ky., are being tabulated.

Place Tonnage for Boats

Cleveland, Oct. 2.—About 10,000 tons of steel, largely plates, will be supplied by the Carnegie Steel Co. for two lake ore freighters awarded the past week by the Ford Motor Co. One of these vessels will be built by the American Shipbuilding Co. and the other by the Great Lakes Engineering Works, Detroit. These boats will be equipped with diesel engines and will embody a number of original features. Other vessel work calling for some thousands of tons remains in a pending state before lake yards. A tentative inquiry appeared this week from a valley fabricator for 6000 tons of 3½-inch nickel steel plates for a western pipe line. Buyers' stocks appear to be running down which is bringing more of them into the market for fair sized lots for early shipment. A number of orders for single carload and several carload lots is increasing. Prices are steady at 2.50c, Pittsburgh. Mills in this territory selling at this figure for comparatively early shipment are having no trouble to keep up their rolling schedule. Eastern mills are offering plates for two to three weeks shipment, usually at 2.50c, mill and in exceptional cases have done less.

An inquiry is current here from the outside for 3000 tons of light plates for tank works.

Eastern Orders Small

Philadelphia, Oct. 2.—Miscellaneous plate demands show some improvement, but orders generally are small. The present rate of demand does not exceed 50 per cent of capacity on the average. In some cases lower prices have been instrumental in bringing out some business, which at 2.50c was not profitable to fabricators generally. There is a lack of large lots either before the trade or in prospect. Most buying is of the hand-to-mouth kind. New ship inquiry is for three or six barges for the Standard Transportation Co., a Standard Oil subsidiary, involving a moderate steel tonnage. While the large makers continue to quote 2.50c, base Pittsburgh, equivalent to 2.82c, Philadelphia, some eastern makers are quoting 2.40c on attractive lots and 2.50c on small amounts. The Pennsylvania railroad has not yet lifted the embargo on shipments to its Altoona shops.

Fluorspar Interest Starts

Pittsburgh, Oct. 2.—Fluorspar users who have to buy for their winter requirements are beginning to show sufficient interest at least to obtain prices. At this season of the year, buying usually is conducted because roads from the spar mines still are passable. Inquiries involve 50 to 100 tons each for the most part although some consumers will require larger tonnages and these are slated to come into the market during the present week or the one following. While some small sellers are quoting as low as $19 on the guaranteed material, the regular market prices are $21.50 to $22, f. o. b. Kentucky or Illinois mines. The Edgewater Steel Co. is understood to have bought about 50 tons.

Award Contract for Cables

Philadelphia, Oct. 2.—Cables for the Delaware Bridge project here will be made by the American Cable Co. The Keystone State Construction Co. booked the contract for supplying the cables. Each cable strand is of 30 inches in diameter and is composed of 18,666 wires in each strand. The cables will require 13,500,000 pounds of galvanized wire.

Concrete Demand Slower

Prospective Business Better Although Lettings and Inquiries Still Are Confined to Lots of Small Tonnages—Building Demands Steady

REINFORCING BAR PRICES, PAGE 919

Cleveland, Oct. 2.—Larger tonnages are in sight in the local reinforcing bar market than have been for the past few weeks. The tonnages awarded are mostly of carload lots and under, with inquiries for the most part being confined to such business. Considerable work is dependent upon the outcome of bond issues in the fall elections when a city-county building and the Hilliard bridge are to be voted upon. It is expected that both will be approved, making a market for at least several thousand tons of bars. Although 2.40c, Pittsburgh, is maintained firmly by most mills on new steel bars, some cases of shading have been advanced on favorable tonnages. Warehouse prices are firm at 2.75c, base Pittsburgh, with little tendency to shade except on large lots. On rerolled bars the 2.30c, base mill, price has almost entirely disappeared, with 2.20c to 2.25c, mill, constituting the general market.

Inquiries Few; Sales Fewer

Pittsburgh, Oct. 2.—Concrete bars are comparatively quiet. Only one award and but two inquiries are noted. The former, 130 tons, ordered by the Sanderson-Porter Co. from the Concrete Steel Co. is for the West Penn Power Co. job at Springdale, Pa. About 100 tons will be required for the Boggs avenue elementary school, bids on which close Oct. 11, and bids too are being asked on about 250 tons for the South Hills high school. The concrete bar mill price is unchanged at 2.40c, base Pittsburgh, while sales of bars from warehouse stocks have been made at as low as 2.50c.

Awards at Chicago Sizable

Chicago, Oct. 2.—Reinforcing concrete bar business continues to hold up and considering the number of moderate-sized jobs coming out, the total tonnage placed the past week proves sizable. On the larger jobs 2.75c, Chicago warehouse, appears to be maximum, and lower than this has been done by some warehouses. Smaller contracts occasionally prompt a price above 2.75c, but this figure seems to be the prevailing one in this market. Lettings the past week include one job of 900 tons and another of 450 tons. The Illinois state highways commission has let 260 tons and taken bids Sept. 26 on material for next year's work, but the awards are not expected for some time.

CONCRETE CONTRACTS PLACED

Awards this week	**3,485 tons**
Awards last week	**7,990 tons**
Awards two weeks ago	**3,790 tons**

900 tons, Burlington railroad freight house, to Kalman Steel Co.
800 tons, Fisher Bros. warehouse, Cleveland, to Paterson-Leitch Co.
450 tons, Fish Furniture Co., Chicago, to Olney J. Dean.
200 tons, Olympia Fields club house, Chicago, to Kalman Steel Co.
175 tons, high school, Mishawaka, Ind., to Concrete Steel Co.
165 tons, apartment house at Birmingham, Ala., to Concrete Steel Co.
160 tons, Illinois state highways, to Concrete Steel Co.
155 tons, addition to plant of Willys Overland Co., Toledo, to Concrete Steel Co.
150 tons, Avondale school, Cincinnati, to Max Penker & Son.
130 tons, building at Springdale, Pa., for the West Penn Power Co.; to the Concrete Steel Co.
100 tons, Prescott-White Spar Forest highway, bureau public roads, Phoenix, Ariz., to unkown contractor.
100 tons, Illinois state highways, to Truscon Steel Co.

CONCRETE CONTRACTS PENDING

700 tons, superstructure for plant of Western Electric Co., Kearney, N. J.; bids now being received on general contract.
500 tons, Milwaukee Daily Journal building; pending.
350 tons, terminal warehouse, San Francisco; bids in.
250 tons, factory for Otis Elevator Co., San Francisco; bids being taken.
250 tons, South Hills high school, Pittsburgh; bids being taken.
250 tons, Elks memorial, Chicago; being refigured.
150 tons, Phoenix Utility Co., Duluth, Minn.; pending.
125 tons, Scottish Rite temple, San Jose, Cal.; bids being received.
100 tons, Kenna hall, University of Santa Clara, Cal.; bids being received.
100 tons, Boggs avenue elementary school, Pittsburgh; bids close Oct. 11.

Pipe Mills

Still Well Booked—Cast Grades in Demand by Municipalities

PIPE PRICES, PAGE 919 AND 986

Pittsburgh, Oct. 2.—Pipe mills continue to enjoy a call for standard full weight merchant pipe, chiefly in the smaller sizes. Supply houses keep up a constant hammering for deliveries, being short of so many sizes that are needed to complete projects now under way before the cooler weather sets in. The fact that there are no stocks anywhere in the country bespeaks good business for the pipe mills for several months to come. Oil country goods, line pipe, etc., have become slightly more inactive although small lots of casing and line pipe are fairly numerous. The usual order involves either single carloads or up to 200 tons at a time; occasional orders coming to large producers such as the National Tube Co. call for 500 to 1000 tons. Pipe mills continue to maintain average operations around 90 per cent of capacity.

Makers Sold Far Ahead

New York, Oct. 2.—New bids will be closed Oct. 6, by the department of water, gas and electricity, this city, on 5000 tons of cast iron pipe for the various boroughs. The Watazo Contracting Co., recently awarded a contract for supplying and installing 700 tons of cast iron pipe for the department of water, gas and electricity, is reported to have placed the pipe. The market generally continues strong, with sellers sold ahead to around the end of the year. Prices are unchanged.

Demand Is Not Lessening

Buffalo, Oct. 2.—Selling of pipe shows no lessening. Business is as good as it has been for the past two years. Demand is principally for tubular goods used in dwelling house construction.

Pipe Makers Well Booked

Chicago, Oct. 2.—Only one maker of cast iron pipe is understood to be in position to make delivery on small sizes the remainder of this year. It is reported premiums are being paid on small sizes. The quotation at Chicago ranges from $58.20 to $60.20 for the base size, but as high as $64.20 has been paid for immediate delivery. No shading is reported on the larger sizes.

Lettings More Active

Birmingham, Ala., Oct. 1.—Cast iron pipe tonnage placed is showing an increase. Several plants in this section will have warrant for steady operation through the winter. The National Cast Iron Pipe Co. now has three of its four DeLavaud machines in operation. The United States Cast Iron Pipe & Foundry Co. will have its six additional DeLavaud machines going during this month.

CAST IRON PIPE PLACED

2500 tons, 48-inch pipe for work at Omaha, Nebr., to United States Cast Iron Pipe & Foundry Co.
1024 tons, large size pipe for work in Ponce, Porto Rico, to American Cast Iron Pipe Co.
700 tons, department of water, gas and electricity, New York, placed through the Watazo Contracting Co., general contractor, with unnamed maker.
600 tons, 4 and 6-inch pipe for Oak Lodge Water district, Oak Lodge, Oreg., to United States Cast Iron Pipe & Foundry Co.
500 tons, work at Orrville, O., to J. B. Clow & Sons Co.
495 tons, work in San Francisco, to American Cast Iron Pipe Co.
300 tons, work at Berne, Ind., to United States Cast Iron Pipe & Foundry Co.
240 tons, work in Hollywood, Cal., to American Cast Iron Pipe Co.
200 tons, work at Port Huron, Mich., to J. B. Clow & Sons Co.

CAST IRON PIPE PENDING

5205 tons, 4, 6, 8 and 12-inch class B pipe for Los Angeles; bids in.
5000 tons, department of water, gas and electricity, New York; bids close Oct. 6.
1200 tons, work in Lake county, O.; bids in Sept. 28, to be let Oct. 8.
515 tons, 6 and 16-inch class B pipe for San Diego, Cal.; bids in.
500 tons, work at Detroit; bids in.

Wire and Nail

Demand Continues in Fair Volume—Much Small Lot Buying

WIRE PRICES, PAGE 919

Pittsburgh, Oct. 2.—Although wire product specifications have been received at a lower rate this past month than in the same period a year ago, in some cases by 50 per cent, still a comfortable business is being done. This consists mostly of nails and bright wire with a fair sprinkling of small orders for fencing, barbed wire, staples, etc. Wire plant finishing departments are operating on an average around 80 per cent. Business expected to materialize before now still is pending, although makers believe that fair sized tonnages will be received about the middle of October. Jobbers keep up a steady rain of small orders. Full market prices continue to apply, 2.75c,

base Pittsburgh, for plain wire, and 3.00c for nails.

Jobbers Are Replenishing

Chicago, Oct. 2.—While makers report a fair volume of business, with prices holding firm, most jobbers are ordering fair quantities and while replenishing their stocks do not feel inclined to increase them. So far the Japanese catastrophe business has not been noticeably reflected here. The leading maker continues to operate at about 75 per cent of capacity. Plain wire continues at 2.75c, Pittsburgh, and nails at 3.00c, Pittsburgh.

Much Tin Plate

Will Be Needed in 1924 According to Preliminary Inquiries

TIN PLATE PRICES, PAGE 919

Pittsburgh, Oct. 2.—Based on the way inquiries for tin plate are developing for the first quarter and first half of 1924, the tin plate mills of the country will be hard put to it to supply the demand since consumption next year promises to be even greater than it has been during 1923. Users say nothing about price in connection with these tentative inquiries, merely wishing the tin plate producers to be conversant with their prospective requirements. While common labor is easy to obtain, skilled labor necessary to man the tin mills is difficult to collect. Large plants are endeavoring to supply themselves with hot mill crews but at best this is a slow process as well as expensive since so many sheets have to be spoiled in instructing the new heaters, doublers, catchers, etc. Tin plate operations average throughout this district 80 to 90 per cent of capacity. Users all want deliveries as early as possible of the material they have on order and while the American Sheet & Tin Plate Co. is fully obligated to the end of the year, the independent producers are sold up for October and part of November business at least. The tin plate price is unchanged at $5.50 per base box of 100 pounds, Pittsburgh.

Iron Ore Shipments To Date 46,000,000 Tons

Cleveland, Oct. 2.—Shipments of iron ore from the Lake Superior district in September totaled 9,095,891 tons, compared with 10,296,133 tons in August. The total for this season to Oct. 1 is 45,988,845 tons, against 33,111,238 tons in the same period of 1922.

Consumption of Lake Superior iron ore in August amounted to 5,353,147 tons or 394,209 less than in July, according to figures issued today by the Lake Superior Iron Ore association. The total tonnage at furnaces and Lake Erie docks Sept 1 was 32,831,227 tons as compared with 37,630,036 Sept 1, 1922. Further details follow:

	Tons
Ore consumed in July	5,747,356
Ore consumed in August	5,353,147
Decrease in August	394,209
Ore consumed in August, 1922	2,589,251
Ore on hand at furnaces Sept. 1, 1923	26,923,955
Ore on Lake Erie docks Sept. 1, 1923	5,907,272
Total at furnaces and Lake Erie docks Sept. 1, 1923	32,831,227
Total at furnaces and Lake Erie Docks Sept. 1, 1922	37,630,036

New Sheet Demand Light

Prices Holding Firm on All Grades Except Black—Mills Offering Earlier Delivery—Some Tonnages Booked for Japan

SHEET PRICES, PAGE 919

Pittsburgh, Oct. 2.—While shipments of sheets on contracts continue heavy and operations are at a fairly high rate, new orders are in the majority of cases disappointing. In the experience of a number of producers, September business was either equal to or just slightly below that of August. Because of the presence of considerable export business, chiefly from Japan, October promises to exceed the September quota of orders. One interest reports the sale of 12,000 to 15,000 tons of black, galvanized and electrical sheets for shipment to Japan within the past two weeks. The Japanese government, through the United States government, now is endeavoring to line up 60,000 tons of corrugated galvanized sheets for reconstruction purposes. The United States department of commerce is sending out the inquiries with no suggestions as to how they should be handled, and the likelihood is that it will be purely on a business basis after sources of supply are determined and the purchases conducted in the usual way by different Japanese exporting houses in New York under the supervision of the Japanese government. Two typical orders received last week from Japan were for 1200 tons and 4400 tons, respectively, of black sheets of 28, 29 and 30 gage, although one order for 500 tons of 30½ gage also was accepted. American producers are endeavoring to avoid quoting on the 30½ and 31 gage material as it is undesirable from a rolling standpoint. Mexico has been ordering more sheets. From South America have come several orders, including a few from Brazil. The American Sheet & Tin Plate Co. continues to get calls for large deliveries, and the flow of specifications is practically uninterrupted. On some sizes in certain grades, late October or early November delivery still can be named by it on new business. Independents continue to absorb considerable of the current day-to-day sheet business because of their better delivery position, it being possible for them to ship many orders within two weeks after their receipt. The usual reports of price cuts are going the rounds, efforts to break the market being particularly numerous at the moment. The price of 5.35c, base Pittsburgh, applies to full-finished automobile sheets. Orders for galvanized sheets, reported taken at a lower figure than 5.00c, are found to carry the full market price of 5.00c, base Pittsburgh. Some blue annealed sheet business reported taken on a plate basis is discovered to have carried the regular blue annealed base of 3.00c, Pittsburgh. The majority of the producers of black sheets are naming 3.85c, base Pittsburgh. Only one or two small companies are quoting 3.75c, so that the market is better represented by 3.85c. Sheet mill operations continue to average between 80 and 85 per cent of capacity.

Early Deliveries Available

New York, Oct. 2.—Demand for sheets continues quiet in this district. All of the large makers maintain their prices firmly. The only shading in the market involves black sheets, which some of the smaller mills will sell at 3.75c, base Pittsburgh, which is $2.00 per ton lower than the price quoted by the majority of makers. On blue annealed sheets the market continues firm at 3.00c, base Pittsburgh, and on galvanized sheets, 5.00c, base Pittsburgh.

Valley Market Dull

Youngstown, Oct. 2.—Unusual dullness characterizes the sheet market in this district as buyers become more reluctant to place business beyond absolute requirements. While district operations show an insignificant gain over the week just closed, three sheet rolling plants have been placed on the inactive list because of insufficient business. No question is entertained that blue annealed and galvanized are firm at 3.00c and 5.00c, base Pittsburgh, but as for No. 28 black the August price apparently is 3.75c, Pittsburgh. Certain district producers are quoting 3.85c on all inquiries for this grade but orders are not satisfactory.

Tonnages of attractive gages and sizes of black sheets are being offered at 3.50c, and mill wasters at $40 and less. It requires good salesmanship to move any kind of a tonnage even at these figures. Until spot tonnages are less available there is little reason to believe the price of 3.85c on black sheets will represent the minimum market. Light gage black orders are coming out from export houses handling Japanese accounts. Two district producers took about 900 tons of 30-gage this week. High grade sheets are quoted at 5.35c, Pittsburgh, for No. 22. A letup in demand is noticeable. Blue annealed is quoted at 3.00c black, 3.75c to 3.85c, and galvanized at 5.00c base Pittsburgh.

Sheet Orders Equal Shipments

Chicago, Oct. 2.—Sheetmakers report bookings about equal to production. One maker cannot give delivery under 30 to 45 days. About three months' business is on the books of makers in the Chicago district. Some smaller mills are reported to be doing 3.75c, Pittsburgh, on black sheets, but 3.00c, Pittsburgh for blue, 3.85c, Pittsburgh, for black and 5.00c, Pittsburgh, for galvanized, continue to be the market.

Business Well Maintained

Philadelphia, Oct. 2.—Some sheetmakers report a larger volume of new business, and on the whole business is well maintained. The volume, however, is not equal to production generally, and some mills are eager for orders. While the leading makers continue to maintain a price on black sheets of 3.85c, base Pittsburgh, others are willing to sell at 3.75c. A price of 4.90c, base Pittsburgh, is quoted on galvanized sheets in one instance, but this is exceptional and 5.00c generally is maintained. Blue annealed sheets continue firm at 3.00c, Pittsburgh.

Shape Market Stronger

Inquiries for Heavier Tonnages Increases Cheerful Tone Prevailing—Small Buyers Continue To Predominate in Demand

STRUCTURAL SHAPE PRICES, PAGE 919

Chicago, Oct. 2.—South Dakota is to take bids Oct. 10 and 23 for 2200 tons for bridges at Wheeler and Mobridge. This inaugurates a bridge-building program which includes a total of five structures. The Sheridan Trust & Savings bank job in Chicago, which was to take 2300 tons, has been reduced to 1800 tons by the elimination of four stories. For the season, structural buying is holding up. The condition of the Chicago market is evidenced by the fact that the valuation of September building permits was $27,874,700, the largest since May and $7,740,000 greater than August. In the first nine months of this year building permits totaled $252,985,916, or $20,000,000 more than in all of 1922. The price of plain material continues to be 2.50c, Chicago mill.

Fabricators Work on Backlogs

Pittsburgh, Oct. 2.—Structural shape activity continues limited as regards new local projects. Within a week or two the award of the Oil City, Pa., bridge, about 1500 tons, will no doubt take place. Pittsburgh interests are low bidders, including Walter S. Rae, general contractor, but some modifications are to be worked out before the final award is made. Fabricators continue to operate at a fairly high rate on orders booked some time ago, many of them at a distance from Pittsburgh, but all report new business, particularly large tonnages, as slow in materializing. Shapes continue quotable at 2.50c, base Pittsburgh.

Activity Drops During Week

New York, Oct. 2.—Structural activity the past week has been rather slow. While some substantial tonnages are pending, little fresh inquiry of importance has come out, and sizable orders are scattered. The three leading mills supplying this district continue to quote 2.50c, Pittsburgh, on plain material, with concessions of about 10 points being offered on limited tonnages by some of the smaller mills. Fabricated material is holding approximately the same levels, although premiums for nearby shipments are in lesser evidence.

Price Shading Prevalent

Philadelphia, Oct. 2.—Consumers of structural shapes in this district report that it is easy to place attractive tonnages of steel with more than one mill at 2.35c, base Pittsburgh, equivalent to 2.67c, Philadelphia. This price is appearing only in exceptional instances as attractive tonnages are offered. Total business being placed is still large due to numerous small orders. Mills continue to operate at around 50 per cent of capacity, although one eastern mill still is operating at from 60 to 70 per cent with a heavy backlog of orders.

New Awards Light

Boston, Oct. 2.—Structural shapes are firm in New England at 2.50c, Pittsburgh, by the Steel corporation and the Bethlehem Steel Co. Three smaller concerns are quoting 2.45c on small tonnages and 2.40c on larger jobs. Sales are not heavy, the chief buyers being warehouses and industrial plants which use shapes for purposes other than building. One manufacturer of road working machinery has been a heavy buyer of shapes. Fabricating plants are well booked and are not anxious for new tonnage at this time. One of the principal fabricators has its capacity taken for the balance of the year, and is forced to sublet urgent work. New jobs are developing slowly.

Lettings Are Larger

Cleveland, Oct. 2.—Lettings of structural shape contracts in this district during the past week were larger than for some time past. A 240-ton job was awarded to the Morgan Engineering Co., Alliance, O., by the Packard Electric Co., Warren, O., while 200 tons for the Union Carbide Co., Buffalo, went to the Bethlehem Steel Corp. Bids are in on the babies and childrens and maternity hospitals, requiring 1500 tons of shapes. Bond issues to be voted on in the fall, if approved, will make a market for several thousand tons each for the city-county building and the viaduct over Cuyahoga river. Prices are firm at 2.50c, base Pittsburgh, on plain shapes, while on average lots $110 is quoted for shapes fabricated and erected.

STRUCTURAL CONTRACTS PLACED

Building awards this week ..... 8,594 tons
Building awards last week .....14,823 tons
Building awards two weeks ago..18,568 tons

2100 tons, state work, Rockport, Ill., reported awarded to independent fabricator.
1800 tons, Sheridan Trust & Savings bank building, Chicago, to Worden-Allen Co.
1100 tons, Elks' building, San Francisco, originally awarded to Golden Gate Iron Works, contract rescinded and awarded to Dyer Bros. Structural Steel Co.
1000 tons, building for Columbia Steel Corp., at Provo, Utah, originally awarded to Union Construction Co., contract rescinded and awarded to Dyer Bros. Structural Steel Co.
1000 tons, gas holder, Metropolitan Utilities Co., Omaha, Nebr., to Stacey Mfg. Co.
800 tons, bridge over Hood river, Oregon, to American Bridge Co.
800 tons, building for the Accident, Fire & Life Insurance Co., Philadelphia, to the Belmont Iron Works.
600 tons, apartment at 15 Park avenue, New York to Taylor-Fichter Steel Construction Co.
600 tons, plant building for Columbia Foundry & Machine Co., Brooklyn, N. Y., to McClintic-Marshall Co.
500 tons, gas holder for Adirondack Power & Light Co., Saratoga, N. Y., to Stacey Mfg. Co.
500 tons, apartment, Fifth avenue and Tenth street, New York, to Taylor-Fichter Steel Construction Co.
500 tons, bridgework for New York Central railroad, awarded to several fabricators.
300 tons, building of New Jersey State college, New Brunswick, N. J., to American Bridge Co.
250 tons, foundry building for Great Western Smelting & Refining Co., San Francisco, to Minneapolis Steel & Machinery Co.
240 tons, transformer building for Packard Electric Co., Warren, O., to Morgan Engineering Co., Alliance, O.
200 tons, bridge for Santa Rosa, Cal., to Pacific Rolling Mills Co.
200 tons, building for Union Carbide Co., Buffalo, N. Y., to Lackawanna Structural Steel Corp.
200 tons, telephone exchange, Woonsocket, R. I., to independent fabricator.
104 tons, bridge for Washington state highway department, to Illinois Steel Bridge Co.
100 tons, bridge for the Chesapeake & Ohio railroad, to eastern independent.
100 tons, sand and gravel plant for Chicago Gravel Co. at Rockdale, Ill., to Milwaukee Bridge Co.

STRUCTURAL CONTRACTS PENDING

4000 tons, Twin Branch power house, Mishawaka, Ind.; bids in Oct. 6.
3000 tons, Mason building, Boston; plans ready for figures.
3000 tons, Fourth avenue subway extensions, New York; T. A. Gillespie low on general contract.
1500 tons, babies and childrens hospital and maternity hospital, Cleveland; bids in.
1500 tons, Oil City, Pa., bridge; Pittsburgh interests reported as low bidders.
1500 tons, power plant for the American Gas & Electric Co., for erection in Ohio; bids asked.
1200 tons, bascule bridge, California avenue, Chicago; bids being taken.
1100 tons, bridge at Mobridge, S. Dak.; bids in Oct. 23.
1100 tons, bridge at Wheeler, S. Dak.; bids in Oct. 10.
1100 tons, school No. 210, Brooklyn, N. Y.; pending.
1100 tons, school No. 205, Brooklyn, N. Y.; pending.
400 tons, Bell Telephone Co. exchange, Philadelphia; pending.
300 tons, bridge for Vicksburg, Shreveport & Pacific railroad; bids in.
300 tons, theater, Broadway and Fifty-third street, New York; bids asked.
250 tons, addition to Jewish Eighty-second street temple, Cleveland; bids in.
200 tons, Hillside bridge for Cuyahoga county, Ohio; all bids rejected. Bids to be taken again Oct. 27.
140 tons, subway for Sacramento, Cal., general contract to Mortenson Construction Co.
Tonnage not stated, 3800-foot steel bridge over Columbia river between Hood River, Oreg., and White Salmon, Wash.; pending.

Acquires Plants

Inland Steel Absorbs Acme Steel Goods and Milwaukee Rolling Mill

New York, Oct. 2.—The Inland Steel Co., Chicago, it is learned in New York, has acquired the Acme Steel Goods Co., Chicago, and the Milwaukee Rolling Mill Co., Milwaukee. In addition to giving the Inland Steel Co. a greater diversification of products, these properties will add 125,000 tons of finishing capacity annually. This will include 75,000 tons of hot and cold-rolled strip steel from the Acme Steel Goods Co. plants and 50,000 tons of black and galvanized sheets from the Milwaukee Rolling Mill Co.

The Acme Steel Goods Co. has plants at Chicago and Riverdale, Ill., which with extensions now under way at the latter works will have a capacity of 75,000 tons annually of hot and cold-rolled strip steel. This company was organized in 1880 and James E. MacMurray is its president. The Milwaukee Rolling Mill Co. is of comparatively recent origin, having been organized in 1920. It has been operating a plant consisting of eight sheet mills. John I. Beggs is president.

The Inland Steel Co. with three blast furnaces and a large open-hearth plant and finishing mills at Indiana Harbor, Ind., has an annual capacity of 575,000 tons of pig iron, 1,200,000 tons of steel ingots and about 1,000,000 tons of finished steel products. At the present time it is a producer of merchant bars, plates, structural shapes,

standard rails and sheets. The acquisition of the Acme Steel Goods Co. will make it a producer of strip steel for the first time. The Inland Steel Co. now has important extensions to its Indiana Harbor steelworks under way. These include the four large open-hearth furnaces and the 14-inch merchant mill. L. E. Block is chairman of the board of the Inland Steel Co. and Phillip D. Block is president.

New Company Buys Steel Tube Mill Building

The assets of the International Tube Co., Cleveland, have been purchased at receiver's sale by the Cleveland Steel Tube Co., a new Ohio corporation with an authorized capital of $1,200,000. The purchase consists of the mill building, as yet not fully equipped, and in addition about 20 acres of adjacent land on which an option was held by the International company. The company has plans for two mills for the manufacture of ⅛ to 3-inch buttweld pipe. Shareholders of the International company pooled their interests in the purchase of the assets and continue their interest in the Steel Tube company. It is announced equipment is being installed in the building and the company plans to get into production in the next four months.

1922 Statistics Out

The eleventh annual statistical report of the American Iron and Steel institute for 1922 has been issued and copies now are being placed in the hands of members of that organization. The report appears in its usual form and completeness. It contains classified production statistics by individual product, average market prices, miscellaneous statistics and other tabular matter relating to the iron and steel and allied industries of the United States and Canada for the year 1922 and preceding years. The report is published under the direction of E. S. Clarke, secretary of the American Iron and Steel institute and the work of compilation of the data has been in charge of William G. Gray, chief statistician of the institute.

Chicago Output High

Chicago, Oct. 2.—The Illinois Steel Co. continues to have 23 of its 27 steel works blast furnace stacks in the Chicago district in blast. Its steel production continues at about 93 per cent of capacity. The Chicago district sales office of an important producer reports its September bookings approximately twice those of August. As a whole, bookings are slightly under shipments. Inland Steel Co. continues at approximately 75 per cent of capacity. The Moline rail bar mill of the Republic Iron & Steel Co. is to resume operations this week.

William J. Keith, who was president and treasurer of the bankrupt Kescot Mfg. Co., Providence, R. I., has filed a voluntary petition in bankruptcy with liabilities of $105,595 and assets of $277.

Much Car Buying Expected

Total of 75,000 Cars May Be Placed This Quarter—Rail Orders Continue To Aggregate Large Tonnage

RAILROAD TRACK MATERIAL PRICES, PAGE 919

New York, Oct. 2.—Substantial car buying is expected to develop this fall, although demand as yet has failed to show any material improvement. Both orders and inquiries are small and scattered. Locomotive buying also continues restricted. A leading inquiry calls for 20 locomotives for the Southern Australian government railroad, reported in a recent issue as inquiring for 1200 freight cars. The Temiskaming & Northern Ontario is inquiring for four locomotives, and the Nadawah Lumber Co., has ordered one locomotive and the Long Bell Lumber Co., three, including a switch engine, both contracts going to the Baldwin Locomotive Works.

The Chesapeake & Ohio railroad has placed 30,000 tons of rails of which 13,000 tons went to the Bethlehem Steel Corp., and 8700 tons each to the Inland Steel Co. and the Illinois Steel Co. A better demand for light rails is shown, especially from mining companies.

The Baltimore & Ohio railroad has purchased 50,000 tons of rails for 1924 delivery, distributing the order among the following mills: Carnegie Steel Co., 25,000 tons; Illinois Steel Co., 4000 tons; Cambria Steel Co., 10,000 tons; Inland Steel Co., 3000 tons, and Bethlehem Steel Corp., 8000 tons. All of the order was for 100-pound rails excepting 5000 tons for which 130-ton rails was specified.

Not Buying Far Ahead

Pittsburgh, Oct. 2.—Coal mine operators are not buying their light rail supplies far ahead. From 2.15c to 2.25c, base Pittsburgh, continues to be quoted on light rails, with large interests such as the Bethlehem Steel Co. and the Carnegie Steel Co. maintaining the 2.25c, figure. Rerollers quote as low as 1.90c, Pittsburgh, but only a few small orders are being placed for their rails as well.

Track accessory makers still have good backlogs of orders for spikes, tie plates, track bolts, etc. Railroads having placed most of their requirements for the last quarter are already manifesting considerable interest in material for the first quarter of next year. Locally, standard spikes remain quotable at 3.15c, base Pittsburgh, although it is reported here that some departures from that level are noted in other directions, particularly the East. Week-to-week orders are being placed by jobbers for small spikes at the 3.50c, base Pittsburgh, figure. One order this past week involving 600 kegs carried that level.

Car Buying in Offing

Chicago, Oct. 2.—No car orders are reported to have been placed in the Chicago market the past week, but much business looms in the near future. The program of the Southern Pacific and the Union Pacific railroads each calls for 18,000 cars. The Pennsylvania railroad is expected also to come into the market shortly. The Chicago & Alton railroad is to award 500 gondolas immediately. The belief still prevails here that nearly 75,000 cars will yet be placed this quarter. The Hocking Valley railroad has placed 5400 tons of rails with the Carnegie Steel Co. The Chesapeake & Ohio railroad has awarded the Inland Steel Co. and the Illinois Steel Co. each 8700 tons, and a slightly larger tonnage to the Bethlehem Steel Co. The Cotton Belt and the Missouri, Kansas & Texas railroad are still to come into the market. The Missouri Pacific is to come into the market for 30,000 tons of rails. The rerolling mills are offering some competition for the light rail business.

Trolley Tonnage Heavy

Boston, Oct. 2.—New England street railways and electric lines are not as yet completing specifications covering 1924 rails and switch work. Preliminary figures in the hands of steel companies indicate that the total tonnage will be heavy. Figures from steam roads covering first half rails show a total tonnage of about 80 per cent of the tonnage placed a year ago. A few small rail orders and some frog and switch business were placed during the week but the bulk of the tonnage is unlet.

Rail Lots Are Placed

Cleveland, Oct. 2.—An order for 2500 tons of rails for 1924 delivery has been placed by the Clover Leaf railroad of which 1500 tons will be furnished by the Bethlehem Steel Corp. and 1000 tons by the Carnegie Steel Co. The Carnegie Steel Co. has taken 1400 tons of rails for the Akron, Canton & Youngstown railroad.

Pending Tonnage Large

Philadelphia, Oct. 2.—The Pennsylvania and Reading railroads have not yet taken action on their 1924 rail requirements. It is expected that the Pennsylvania will buy from 100,000 to 125,000 tons and the Reading about 25,000 tons.

CAR ORDERS PLACED

E. L. Dougherty & Co., 200 tank cars, to General American Tank Car Corp.

St. Louis Southwestern, five underframes for baggage cars, to Commonwealth Steel Co.

CAR ORDERS PENDING

American Short Line Railroad association, 500 automobile cars; bids asked.

Cheswick & Harmer, 10 hopper cars; pending.

Lehigh & New England, eight cabooses; pending.

To Hold Golf Tournament

Philadelphia, Oct. 2.—Members of the Steel Club and Iron Mongers association, Tubal Cain chapter, comprising steel and pig iron sellers in the Philadelphia district will hold a joint golf tournament Oct. 24.

The Nonferrous Metals

Prices Generally Lower Except in Tin—Zinc Trade Light—Copper Weak Account German Affairs

	Copper Electro delivered	Copper Lake delivered	Spot Straits New York	Lead† New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
Sept. 26.....	13.50	13.87½	41.75	7.05	6.40	25.00	7.50	29.00
Sept. 27.....	13.50	13.87½	41.37½	7.00	6.37½	25.00	7.62½	29.00
Sept. 28.....	13.50	13.87½	41.37½	7.00	6.35	25.00	7.75	29.00
Oct. 1.....	13.37½	13.75	42.00	7.00	6.30	25.00	7.62½	29.00
Oct. 2.....	13.30	13.75	42.00	7.00	6.27½	25.00	7.62½	29.00

†Outside market quotation.

NEW YORK, Oct. 2.—Heavy shipments and light buying have been the principal features of the metal markets the past week. Prices of the principal metals have been easy, both in London and New York. The disturbing political situation in Germany has resulted in sharp contraction in German purchases of copper and other materials and is a definite market factor. Domestic consumption of the metals has been curtailed somewhat from the peak of last spring, yet the manufacturing of the principal metal products continues at a rate in excess of previous peacetime years.

Having booked a good tonnage of copper the third week in September when the market dropped to 13.25c, delivered, producers held firmly at 13.50c the last week in September. During this week, however, the London copper market dropped £1 and this resulted in the shaking of the American producers from their 13.50c stand to 13.37½c at the close of the week and today as low as 13.25c. The electrical trades have been heavy consumers of copper, but the brass business has been slow. Casting copper eased off to 13.00c refinery, and lake was also easier, though the principal sellers have not been inclined to join in the downward movement. Scrap has been held firmly in the face of the drop in virgin metals.

Zinc eased gradually from 6.40c to 6.25c and 6.30c in the past week, with a moderate amount of export business in high grade and prime western zinc, but a small demand from domestic users. The American steel sheet galvanizers have worked down their unfilled orders to a few weeks operations and have not been buying zinc excepting for immediate needs.

Sales of pig lead have been made the past few days at 6.65c, East St. Louis and at 7.00c, New York. The market has been relatively dull following the buying movement of the first two weeks of September.

Tin has fluctuated rather aimlessly in London and the London movement of course has been followed in a general way by the New York market. However, American consumers have bought rather heavily against fourth quarter requirements and they have not been inclined to enter the tin market either on its ups or downs. Straits tin prices the past week have fluctuated between 41.25c and 42.00c with 99 per cent tin obtainable at about ½ cent under Straits.

The antimony market has experienced a little stiffening, with offerings at 7.62½c duty paid against 7.37½c, the previous week. Offerings for importation have been scarce, due to the rise in Chinese exchange resulting from the increase in silver prices. This has stiffened the Chinese price to above the spot price here.

Some sales of 98 to 99 per cent virgin ingot aluminum have been made at 25c, New York, in the outside market, involving several hundred tons. This is the same price as quoted by the domestic producer. The market is a little more active, due to the covering of fourth quarter requirements by a few large consumers. The foreign aluminum situation continues strong, as the European consumption is able to absorb all the foreign output, and foreign producers are alloting restricted tonnages to this side in order to hold their American trade.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled, 4 oz., min.	21.75
High brass	18.00
Zinc, ga. 9 to 18 (plates ½c less)	9.25
Lead, full sheets (cut ¼c more)	10.75
Aluminum, base 18 ga. and up...	35.40
SEAMLESS TUBES	
High brass	23.00
Copper	24.50
RODS	
High brass, round, ⅜ to 2½-inch	15.75
Naval brass rod	18.50
WIRE	
Copper	16.00 to 16.25
High brass	18.50

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	9.00 to 9.50
New York	9.00 to 9.25
Chicago	9.00 to 9.25
HEAVY YELLOW BRASS	
New York	6.25 to 6.50
Chicago	6.75 to 7.25
Cleveland	6.00 to 6.50
ZINC	
New York	4.25
Cleveland	3.00 to 3.50
HEAVY COPPER AND WIRE	
Cleveland	11.00 to 11.50
New York	11.25 to 11.75
Chicago	11.25 to 12.00
RED BRASS TURNINGS	
New York	8.00 to 8.25
Cleveland	8.00 to 8.50
Chicago	8.50
YELLOW BRASS TUBING	
Cleveland	6.00 to 6.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.00 to 6.50
New York	6.75 to 7.00
Chicago	7.25
ALUMINUM BORINGS	
Cleveland	10.00

The United Alloy Steel Corp. Canton, O., reports net earnings for the first eight months of 1923 amounting to $2,347,040, after taxes and depreciation.

Japanese Inquiries

Again are Appearing in Volume—Report Steel Duty is Waived

New York, Oct. 2.—Steel inquiries from Japanese sources again are larger in volume. There are several inquiries for black sheets involving 1000 to 5000 tons each. Two inquiries for nails for Japan aggregate 12,000 tons. Another Japanese inquiry calls for 1000 tons of bars. There also are some wire rod inquiries. It is not expected that all of this material will be bought. However, a fair business is being booked from Japan. Sales of the past week involve at least 3000 to 4000 tons of wire rods, a few thousand kegs of nails, 6000 or 7000 tons of black sheets and smaller tonnages of other material. Included in pending Japanese inquiries are 1000 to 2000 tons of standard gage rails and 1000 to 2000 tons of light rails.

The Japanese government is understood to have waived until March 31, 1924, the duty on all iron and steel imported for reconstruction purposes. It also is understood that plans are under way toward the creation of a central purchasing organization and it is stated that an American branch will function at Washington and that some scheme of cooperation with government officials at Washington is being worked out.

Provides Funds for Metallurgical Institute

Provision for the establishment of a metallurgical institute in or near Columbus, O., is made in the will of the late Gordon Battelle, iron and steel manufacturer of that city, who died recently. The will stipulates that one-half of the residuary estate shall be devoted to this purpose after $100,000 is given to the creation of a Battelle memorial at the American university, Washington, D. C., and after 10,600 shares of common stock in the American Rolling Mill Co. have been distributed among relatives. An estimate is made that the amount which may be available for the metallurgical institute will be approximately $1.-000,000. Mr. Battelle was a director of the American Rolling Mill Co. and had other iron and steel interests. He was the son of Col. John Gordon Battelle, former owner and president of the Columbus Iron & Steel Co. and an official of the American Rolling Mill Co.

Ore Imports Again Low

Philadelphia, Oct. 2.—Imports of iron and ore into this port for the week ended Sept. 29 again were lower than the levels reached during August. Iron ore receipts totaled 23,257 tons, of which 13,707 tons came from Sweden, 7750 tons from New Foundland and 2000 tons from Germany. Chrome ore from Bombay, India totaled 1002 tons; ferromanganese from England, 100 tons; manganese ore from Chile, 575 tons and iron and steel scrap from Santo Domingo, 2283 tons.

Program Is Announced For Steel Institute

New York, Oct. 2.—Announcement was made of the official program for the annual fall meeting of the American Iron and Steel institute to be held at the Biltmore hotel, Thursday, Oct. 25. Program is as follows:

President's address—E. H. Gary.
X-Ray Examination of Metals—Col. T. C. Dickson, commanding officer, Watertown Arsenal, Watertown, Mass.
Investigation of the Influence of Temperature on Charpy Impact Value of a Group of Steels of Varying Composition—Dr. F. C. Langenberg, metallurgist, Watertown Arsenal, Watertown, Mass.
Open-hearth Furnace Regenerators—F. B. Quigley, superintendent, open-hearth department, Ohio works, Carnegie Steel Co., Youngstown.
Iron and Steel Industry in China—Chung Yu Wang of Hankow.
The Use of Blast Furnace Slag for Various Construction Purposes—C. L. McKenzie, president, Duquesne Slag Products Co., Pittsburgh.
Recent Developments in Steel Forging—John L. Cox, assistant to president, Midvale Co., Philadelphia.

Following the banquet Thursday evening a special train will be run to Aberdeen, Md., where the institute on Friday will hold a joint meeting with the Army Ordnance association at the army proving grounds. The program for the joint meeting will be devoted to demonstrations of the use of ordnance material actually used in battle including artillery, infantry, air service, etc. These will include the firing of heavy railway mortars and guns, dropping of bombs from bombing airplanes, the firing of antiaircraft guns on moving targets in air demonstration, machine gun barrages on land, attack of tanks against machine gun nests, etc.

Koppers Co. Will Build Gas Plant at Winnipeg

The Winnipeg Electric Railway Co., has placed a contract with the Koppers Co., Pittsburgh, covering the design and erection of a Koppers coal gas plant at Winnipeg, Canada. This plant will consist of 17 combination gas ovens of an improved type having a capacity of 6.8 net tons of coal per charge, together with producer plant and coal and coke handling equipment.

This plant will embody the latest developments in coal gas manufacture including provision for underfiring ovens with producer gas, blue gas or oven gas and steaming of ovens. The ovens are designed to operate on a normal coking of 12 hours, which can be reduced to 10 hours or increased as desired, permitting of the greatest flexibility in the production of gas and coke.

This is the third Kopper small oven coal gas plant to be contracted for during 1923. Construction work on the other two plants, located at Battle Creek, Michigan and Zilwaukee, Mich., is progressing rapidly and both plants will be in operation before the end of the year.

Production of Malleable Castings Increases

Washington, Oct. 2.—Production of malleable castings manufactured for sale as such in August, totaled 68,069 tons as compared to 57,881 tons in July, according to figures issued by the department of commerce. The 112 plants reporting operations for August with a monthly capacity of 103,068 tons, operated at 66.0 per cent of capacity, as compared to the 108 plants of July, having a capacity of 98,241 tons a month, operating at 58.9 per cent.

The figures for July in the following table are revised to include reports received subsequent to the preliminary figures issued for that month by the bureau of census.

	Total tons prdouced	Per cent of capacity	Total tons booked	Monthly capacity
May	64,726	71	52,898	91,174
June	65,168	67.7	42,067	96,240
July 22....	57,881	58.9	41,723	98,241
August ...	68,069	66.0	39,830	103,068

On the basis of operations of 103 identical establishments, the total production was 63,038 tons in August, 54,433 tons in July and 63,298 tons in June, while operations were at 66.7 per cent of capacity in August, 57.4 per cent in July and 66.7 per cent in June.

Output of Beehive Coke Again Is Lower

Washington, Oct. 2.—The production of beehive coke in the week ended Sept. 22, decreased from the preceding week says the Geological Survey. The total was 327,000 net tons, against 317,000 tons, the revised figure for the week before. The cumulative output of beehive coke during the present year to date stands at 14,174,000 net tons. This compares with 4,623,439 net tons in the corresponding period of 1922; 4,034,169 net tons in 1921; 15,694,802 in 1920; and 14,484,755 net tons in 1919.

The production of bituminous coal is increasing again. In the week ended Sept. 29, early estimates indicate an output of 11,400,000 tons. The weekly production record of coke by districts follows:

	Week Ended Sept.22 1923	Sept.15, 1923	Sept.23, 1922
Pennsylvania and Ohio	265,000	259,000	99,000
West Virginia	17,000	14,000	11,000
Kentucky, Alabama Tennessee and Georgia	20,000	20,000	13,000
Virginia	14,000	13,000	7,000
Colorado and New Mexico	6,000	6,000	5,000
Washington and Utah..	5,000	5,000	4,000
United States total....	327,000	317,000	139,000
Daily average	55,000	53,000	23,000

Irving Iron Works Co. Holds Convention

The Irving Iron Works Co., Long Island city, N. Y., manufacturer of subway grating and steps, held a three-day sales convention Sept. 12 to 14.

The convention opened Wednesday, Sept. 12 with a lunch at the Hotel Lorraine, New York. In the afternoon the entire sales force journeyed to Long Island city and inspected the plant. Some 40 salesmen were divided into four groups and the manufacturing of the product was shown them from the raw material to completion. While inspection was in progress a buffet luncheon was served in the sales department. Wednesday evening, a banquet was given to the sales force at which W. E. Irving, president; C. L. Price, general manager; L. A. Wightman, advertising counselor, M. K. Griggs, Houston representative; A. T. Vonier, Milwaukee representative; and W. M. McKee of the production department were the speakers.

The business meeting on Thursday lasted until midnight, with brief adjournments for luncheon and dinner, and an inspection trip to the Hell Gate power plant of the United Gas & Electrical Co., New York. On Friday, a clambake was given at the home of Mr. Irving at Glenbrook, Conn.

The convention was national in its scope as those in attendance came from all parts of the United States and Canada. Those present were as follows:

Walter E. Irving, president; P. L. Price, general manager; W. J. Brown, secretary; E. Brodhead, assistant sales manager; R. R. Glover, Cincinnati; J. S. Hower, Utica, N. Y.; F. C. Yale, New York; L. F. Gomes, Montreal, Canada; W. F. Smith, Atlanta, Ga.; H. S. Ayres, Huntington, W. Va.; W. F. Luebkert, New York; C. S. Line, New York; R. R. Willford, Minneapolis, Minn.; W. H. VanOrden, New York; H. B. Myers, Washington, D. C.; C. A. Grunden, New York; George M. Demorest, Pittsburgh; R. J. Barry, New York; W. B. Martin, Knoxville, Tenn.; Maurice Nicholls, New York; C. H. Lewis, New York; William Sell, Birmingham, Ala.; L. D. Stauffer, Cleveland; W. C. Fletcher, Indianapolis, Ind.; C. H. Lewis, Kansas City, Mo.; S. P. Gerow, New York; George N. Thompson, Glenbrook, Conn.; Thomas B. Burnite, Denver, Colo.; J. C. Lynn, San Francisco; Charles E. Kain, Dallas, Tex.; S. M. Bell, New York; B. A. Prince, Boston; R. C. Hutchinson, Buffalo, N. Y.; William Noblett, Jersey City, N. J.; L. I. Wightman, New York; R. Baldwin, Philadelphia; B. L. Fralick, Detroit; M. K. Griggs, Houston, Tex.; I .H. Miller, New York; W. M. McKee, New York; E. W. Kennard, New York; B. H. Mueller, St. Louis; A. T. Vanier, Milwaukee; R. C. Stearns Jr., New York; and H. L. Fessenden, New York.

Iron Output Again Shows Decline

With 3,123,611 Gross Tons, Pig Iron Production Is the Lowest Since February—Net Loss of 13 Furnaces Blown Out or Banked Reduces Number Active on Sept. 30 to 257—Fourth Month of Decline

FOLLOWING another month of curtailed blast furnace operations, pig iron production for September fell to the lowest total since last February. A sharp drop in output was expected due to the fact that many furnaces became inactive during August to which others were added during September, and also because September was a one day shorter month than August. On the last day of the month 257 furnaces were active as compared with 270 on Aug. 31, making a net loss of 13 furnaces. Twenty-three stacks were blown out or banked in July and 29 in August. Thus 65 furnaces have been made inactive since June 30, when 322 were in operation. The decline in daily production in September was slightly less than that made in August.

MONTHLY PRODUCTION

	1923	1922	1921
January	3,228,226	1,645,804	2,414,753
February	2,993,918	1,630,180	1,929,394
March	3,523,595	2,035,908	1,594,866
April	3,546,308	2,070,161	1,190,751
May	3,868,486	2,309,348	1,215,272
June	3,667,868	2,362,455	1,064,007
Total 1st half.	20,828,401	12,053,856	9,409,043
July	3,684,677	2,403,030	864,642
August	3,448,886	1,810,665	954,901
September	3,123,611	2,024,008	985,795
October	.....	2,629,655	1,234,450
November	.....	2,846,110	1,414,958
December	.....	3,083,520	1,642,775
Total 2nd half	.....	14,796,988	7,097,521
Grand total..	31,085,575	26,850,844	16,506,564

Production of pig iron in September totaled 3,123,611 gross tons and was a loss of 325,275 tons from the 3,448,886 tons made during the preceding month. This was 744,611 tons below the high point production of May and the lowest since February. On an average daily basis, the September output was 104,120 tons per day, which compared with the 111,254 tons of August, was a loss of 7134 tons. This was practically the same rate as during January of this year. Average daily production has been on the decline for four consecutive months, having dropped 20,670 tons per day, or 16.5 per cent, since the peak rate of 124,790 tons was attained in May.

AVERAGE DAILY PRODUCTION

	1923	1922	1921	1920	1919
Jan.	104,136	53,090	77,895	97,172	106,654
Feb.	106,925	58,220	68,906	102,904	105,120
March	113,664	65,674	51,447	108,895	99,614
April	118,210	69,005	39,691	91,754	82,479
May	124,790	74,495	39,202	96,510	67,991
June	122,262	78,748	35,466	101,533	70,467
July	118 860	77,517	27,892	98,190	78,200
Aug.	111,254	58,408	30,802	101,468	88,453
Sept.	104,120	67,466	32,859	104,143	82,692
Oct	.....	84,827	39,821	106,075	60,142
Nov.	.....	94,870	47,165	97,836	80,244
Dec.	.....	99,468	52,992	87,105	84,711
Ave.	113,866	73,563	45,223	99,456	83,910

Merchant iron produced in September was 738,539 tons and a loss of 89,624 tons from the 828,163 tons made in August. On an average daily basis, this represented 24,618 tons per day, which compared with the 26,715 tons of the previous month was a decrease of 2097 tons. Nonmerchant or steelworks furnaces made 2,385,072 tons in September, or 235,651 tons less than the 2,620,723 tons produced during the month before. Reduced to a daily basis, this output was at the rate of 79,502 tons per day, as against 84,539 tons per day in August, the loss being 5037 tons.

Stacks active on Sept. 30 totaled 257, as against 270 on Aug. 31, the loss being 13 stacks. This was the smallest number of operating furnaces since last December when 253 were active. During September two merchant stacks were blown in and eight were blown out, the net loss being six stacks. Of the nonmerchant class, two were blown in and nine were blown out, the net loss for this class being seven stacks. Of the total number of furnaces blowing on the last day of the month 78 were merchant and 179 were nonmerchant. The corresponding figures for August were 84 and 186, and for July 97 and 202, respectively.

DIVISIONS OF PRODUCTION

1922	Merchant	Non-merchant	Spiegel	Ferromanganese	Other ferro
Jan.	388,322	1,257,482	1,230	5,644	825
Feb.	355,455	1,274,725	4,930	3,618	872
March	390,643	1,645,265	2,095	11,604	1,102
April	375,814	1,694,347	4,211	14,998	828
May	410,404	1,898,944	4,902	15,432	405
June	423,672	1,938,783	4,817	18,254	854
July	441,752	1,961,278	7,176	18,873	1,887
Aug.	343,522	1,467,143	7,925	11,402	976
Sept.	353,604	1,670,404	4,235	10,681	934
Oct.	502,231	2,127,424	12,285	9,193	1,080
Nov.	603,348	2,242,762	4,192	13,232	961
Dec.	668,950	2,414,570	10,591	17,108	989
Total 1923	5,257,717	21,593,127	68,589	150,039	11,713
Jan.	713,186	2,515,040	12,056	19,358	952
Feb.	708,901	2,285,017	3,657	21,410	759
March	767,219	2,756,376	13,832	20,730	236
April	795,558	2,750,750	7,440	20,810	670
May	909,726	2,958,760	9,533	19,568	892
June	899,102	2,768,766	18,184	19,717	874
July	900,496	2,784,181	12,876	26 493	776
Aug.	828,163	2,620,723	5,595	22,044	1,800
Sept.	738,539	2,385,072	4,478	23,206	1,860

Among the stacks blown in during September were: In Pennsylvania: Sharpsville, Allen S. Davison Co.; Midland No. 3, Pittsburgh Crucible Steel Co. In New York: Buffalo C. M. A. Hanna Co. In Kentucky: One Ashland, American Rolling Mill Co.

Furnaces blown out or banked during the month were: In Ohio: Mattie, A. M. Byers Co. of Ohio; McKeefrey Iron Co.; Wellston No. 2, Wellston Iron Furnace Co.; In Pennsylvania: One Edgar Thomson and two New Castle, Carnegie Steel Co.; Midland No. 2, Pittsburgh Crucible Steel Co.; one Cambria and one Coatesville, Bethlehem Steel Co. In New York: Buffalo B, M. A. Hanna Co.; one Lackawanna, Bethlehem Steel Co. In Maryland: One Maryland, Bethlehem Steel Co. In Virginia: Pulaski, Pulaski Iron Co. In Alabama: City No. 1 and Philadelphia, Sloss-Sheffield Steel & Iron Co.; Vanderbilt, Woodward Iron Co. In Illinois: South Works New No. 8, Illinois Steel Co.

SEPTEMBER PIG IRON

	No. of stacks	No. in blast last day of month Sept.	Aug.	Total tonnage made Merchant	Nonmerchant	Total Sept.	Aug.
Pennsylvania	150	100	104	192,180	945,004	1,137,184	1,247,042
Ohio	79	50	53	110,664	594,100	704,764	780,003
Alabama	42	21	24	121,584	91,735	213,319	230,671
Virginia	19	5	6	19,873	.....	19,873	27,848
New York	27	20	21	90,061	113,767	203,828	243,347
New Jersey	4	2	2	18,293	.....	18,293	19,449
Illinois	26	20	21	100,839	225,041	325,880	359,570
Colorado	5	1	1				
Indiana	16	16	16	28,358	295,535	323,893	345,141
Maryland	6	4	5				
Wisconsin	6	2	2				
Kentucky	7	1	0				
West Virginia	5	3	3	15,546	46,626	62,172	78,907
Tennessee	14	5	5				
Washington	1	0	0				
Georgia	2	0	0				
Texas	1	0	0				
Minnesota	3	3	3	30,286	54,575	84,861	87,439
Michigan	4	4	4				
Missouri	1	0	0				
Spiegel and ferro—all states	...	....	...	10,855	18,689	29,544	29,439
Totals	418	257	270	738,539	2,385,072	3,123,611	3,448,886

Germans Make Sales to Japan

Several Thousand Tons of Nails and Plain Wire Placed at $72.64, f. o. b.—More Orders for Sheets Closed with English Makers—Ferromanganese Forced Down by Slack Demand—French Form Selling Syndicate for Ruhr Steel

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, Oct. 2.—Japan has ordered from Germany several thousand tons of nails and plain wire at £16 ($72.64) f.o.b. Business in the unoccupied portion of Germany has not been affected as yet by the recent riots and other disturbances. Only one blast furnace stack is in operation in the Ruhr, and it is apparent resumption will be slow even if further political troubles can be avoided. There are but few changes this week in the prices of German iron and steel products.

Japan has suspended the import duty on sheets and structural steel, and is buying thin black sheets from English makers at £13 ($59.02) f.o.b., and the ordinary quality at £15 5s ($69.23), according to Japanese specifications. The British plate market is more active. The Leeds Forge has taken an order for 350 40-ton cars for a railroad in South Africa.

The British pig iron market also shows more activity. Developments in the Ruhr have weakened the export market for coke. The demand for ferromanganese has slackened, forcing makers to reduce their prices 10 shillings ($2.27). French interests have organized a company with a capital of 1,000,000 francs to sell steel made in the Ruhr district, under the management of the Comite des Forges.

Price changes in the British market this week bring the following products to the levels noted:

Black sheets for home £13 ($59.02); black sheets for export £12 15s ($57.89); galvanized sheets £19 5s ($87.40); East coast hematite £4 19s ($22.47); Northamptonshire No. 3 foundry iron £4 8s 6d ($20.09); ferromanganese for home or export £17 10s ($79.45); foundry coke for export £2 7s 6d ($10.78).

Pound sterling is figured on a basis of $4.54.

Better Tone Is Indicated in British Markets

European Staff Special

Office of IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,

BIRMINGHAM, Eng., Sept. 21.—The misfortunes of Japan have turned out to be somewhat to the advantage of the British iron and steel trade, a few substantial orders having reached this country. So far the demand is chiefly for galvanized and black sheets, wire nails and wire. What the English mills want are orders calling for heavy tonnages, and at present there is no sign of these even from Japan. Nervous consumers have hastened to place a certain amount of speculative business which has strengthened the market.

The Japanese business has had a share in the restarting of three furnaces at Llanelly, mainly for the supply of material to a large tin plate syndicate. Welsh steel is being absorbed locally and there is consequently very little to spare for the Midlands, which usually take considerable Welsh material.

The pig iron position has not shown much alteration. A blast furnace has been closed down at Redcar, while another has been restarted at Ulverston in the Barrow area. There is more inquiry for pig iron and less hesitation in placing the business. In Cleveland inquiries for the first time in many months have indicated interest in future supplies and some orders have been placed. Stocks are heavy in that

Sterling—$4.54

area and in Barrow, and this tends to weaken prices. The improvement in hematite has been insufficient to maintain the £5 ($22.70) figure which was reached last week, sales being on the basis of £4 19s ($22.47). Similarly in the Midlands foundry irons are weaker. One order is reported to have been placed for Derbyshire iron at £4 17s 6d ($22.13) delivered, and as the transit costs 10s ($2.27) per ton the furnace price would be £4 7s 6d ($19.86). Lately the basis has been understood to be 5s ($1.13) above this. For Northampton iron the figure of £4 10s ($20.43) also has been shaded. Hickmans Ltd., in South Staffordshire usually get their full share of any business in the market, but at present they are only able to employ three of their five furnaces. It is understood that export demands are better and at least one good inquiry from America is the subject of negotiation by a large Glasgow firm. The parcels of pig iron bought in the Midlands have been at easier prices.

Some encouragement has been derived from a rail order placed with the United Steel Co., Workington, the amount of which has been announced as 10,000 tons, though our information is that the order is for 500 tons per month spread over a year. It is given out on behalf of the crown agents of certain colonies. The business is considered to justify the restarting of the rail mills, but much heavier tonnages will be wanted if the mills are to keep going. and against this somewhat encouraging development is the practical closing down of the rail department connected with the Barrow steelworks. At Sheffield there are 2000 more steelworkers out of work than were unemployed a month ago.

Continental competition is less formidable than it was. It seems likely that imports of semifinished steel will be on a diminishing scale now that Belgian mills are filling up and prices there are rising. Few quotations are being received, and as billets cost about £7 15s ($35.18) delivered here, there is no advantage to the buyer, since all the metal required of this character can be bought at the same price from British mills. A number of the steelworks still adhere to the figure of £8 ($36.32) and upward. Belgium. however, continues to send over here large quantities of joists, underselling the British mills by about 10s ($2.27) per ton. A good deal of constructional work is in hand calling for joists.

The finished iron trade is handicapped severely by the 8-hour system

Current Iron and Steel Prices of Europe

Last Reported Prices Converted into Dollars at Rates of Exchange, October 1

British Market

Corrected to Date by Cable

Home Market Prices. Gross Tons at Works or Furnace

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	32.35	7 2 6
Sheet bars	32.35	7 2 6
Wire rods	49.37	10 17 6
FINISHED STEEL		
Steel bars, England, ⅝ to 3-inch	42.00	9 5 0
Steel bars, England, ⅝ to 3-inch, for export	38.59	8 10 0
Plates, ship, bridge and tank, England	40.86	9 0 0
Plates, ship, bridge and tank, England, for export	39.16	8 12 6
Plates, ship, bridge and tank, Scotland	40.86	9 0 0
Plates, ship, bridge and tank, Scotland, for export	39.73	8 15 0
Beams, England	40.86	9 0 0
Beams, England, for export	38.59	8 10 0
Beams, Scotland	40.86	9 0 0
Beams, Scotland, for export	38.59	8 10 0
Sheets, black, 24 gage	59.02	13 0 0
Sheets, black, 24 gage, for export	57.89	12 15 0
Sheets, galvanized, 24 gage	87.40	19 5 0
Rails, 60 pounds and over	38.59	8 10 0
Rails, 60 pounds and over, for export	36.32	8 0 0
Tin plate, base box, 108 pounds	5.22	1 3 0
Steel hoops	52.21	11 10 0
Steel hoops, for export	49.94	11 0 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	22.47	4 19 0
Hematite, West Coast, Mixed Numbers	22.02	4 17 0
Basic, Middlesbrough	21.00	4 12 6
No. 3 Foundry, Middlesbrough	21.79	4 16 0
No. 3 Foundry, Derby, Leicester, Nottingham	20.66	4 11 0
No. 3 Foundry, Northamptonshire	20.09	4 8 6
No. 3 Foundry, Staffordshire	20.71	4 11 3
No. 3 Foundry, Scotch	22.70	5 0 0
Ferromanganese, 76 to 80 per cent	79.45	17 10 0
COKE		
Yorkshire furnace	5.90	1 6 0
Yorkshire furnace, for export	10.22	2 5 0
Yorkshire foundry	7.95	1 15 0
Yorkshire foundry, for export	10.78	2 7 6

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Pounds per metric ton (2205 lbs.)
PIG IRON		
Hematite, Oberhausen	26.33*	5 16 0
Foundry, No. 3, Oberhausen	26.33	5 16 0
Bessemer Stahleisen, Siegen	28.38	6 5 0
Foundry, No. 1, Oberhausen	26.33	5 16 0
Luxemburg foundry	26.33	5 16 0
COKE		
Ruhr furnace	12.49	2 15 0
Ruhr foundry	12.49	2 15 0
SEMIFINISHED STEEL		
Billets	41.92	9 4 8
Sheet bars	43.51	9 11 8
Wire rods	52.66	11 12 0
FINISHED STEEL		
Standard rails	56.75	12 10* 0
Merchant bars	49.71	10 19 0
Structural shapes	49.53	10 18 3
Ship plates	56.03	12 6 10
Medium plates, 3 to 5 millimeters	62.61	13 15 10
Sheets, below 3 millimeters	74.46	16 8 0
Tin plate		Nominal
Plain wire	74.97	16 10 3
Bands and strips	61.95	13 12 11

All prices are f.o.b. furnace or mill.

*German prices now quoted in pounds, sterling.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	29.11	490
Basic bessemer, Lorraine	25.25	425
Foundry, Longwy, No. 3, sand-cast	24.65	415
Foundry, Longwy, No. 3, chill-cast	25.25	425
Ferromanganese, 76 to 80 per cent	89.10	1,500
COKE		
French furnace	8.02	135
German furnace, f.o.b. frontier*	11.88	200
German furnace, f.o.b. frontier**	14.85	250
French foundry	8.61	145
SEMIFINISHED STEEL		
Blooms	31.78	535
Billets	35.05	590
Sheet bars	35.94	605
FINISHED STEEL		
Standard rails	35.64	600
Merchant bars	38.31	645
Angles	36.83	620
Normal beams and profiles	36.83	620
Plates, ship and tank, 10 millimeters and thicker	39.50	665
Plates, bridge and tank, 5 to 10 millimeters	40.39	680
Sheets, black, 3 millimeters	42.77	720
Sheets, blue annealed, 2 millimeters	48.11	810
Shafting, cold-drawn, 40 to 60 millimeters	77.22	1,300
Bars, 2 per cent nickel steel	118.80	2,000

All prices are f.o.b. furnace or works.

*Up to 50 per cent of normal requirements.

**Over 50 per cent of normal requirements.

Belgian Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Basic bessemer, Belgian	22.70	450
Basic open-hearth, Belgian	23.71	470
Gray forge, Belgian	13.62	270
Foundry, No. 3, Belgian	23.46	465
Foundry, No. 3, Luxemburg	22.70	450
Foundry, No. 3, Lorraine	22.95	455
SEMIFINISHED STEEL		
Blooms	30.03	595
Billets	31.28	620
Sheet bars	32.29	640
Wire rods	46.67	925
FINISHED STEEL		
Standard rails	35.32	700
Merchant bars	38.09	755
Normal beams and profiles	35.32	700
Plates, 5 millimeters and thicker	39.36	790
Sheets, black, 3 millimeters	42.78	850
Sheets, galvanized, 1 millimeter	103.42	2,050
Plain wire	63.06	1,250
Galvanized wire	75.68	1,500
Wire nails	65.59	1,300

All prices are f.o.b. furnace or works.

and the high price of fuel. Makers of best iron are in a favorable position with moderately good orders, and are consequently able to maintain their £14 10s figure ($65.83).

The most hopeful department is the sheet trade. The makers have been able to raise their minimum to £19 ($86.26) and it is understood that orders in hand will suffice to keep the mills engaged at least until the end of the year. In addition to the Japanese business, fairly weighty orders have come from Argentina and India. A lot of the Japanese requirements call for sheets of 30 and 31 gage. The orders have affected mills in all districts, the Scotch sheetmakers being busier, and mills in South Staffordshire having to supply the deficiency of the large concerns in South Wales who supply the finished article. The position of the Welsh steelworks also has been improved by an increased demand for semifinished material.

The tin plate works are not keeping pace with the sheetmakers in supplying Japanese requirements. The recent confirmation of prices by the stabilization committee has satisfied buyers that nothing can be gained by waiting for price concessions, and good orders have come from South America and the Far East, a feature of the new business being the substantial proportions called for for October shipments. The basis price of tin plates is continued at £1 3s 1½d ($5.24), but business has been found possible at 3d ($0.05) per box over this figure.

A partial report in the receivership of the Inland Malleable Iron & Steel Co. was filed at Terre Haute, Ind., recently by the receiver. According to the report, receipts by the receiver have amounted to $107,301, and disbursements, $79,058. The amount on hand Sept. 15 was $28,248.

Iron and Steel Seizures in Ruhr Large

Paris, Sept. 21.—The French government has appointed a committee to consider the disposal of iron and steel products seized in the Ruhr or to be seized in the future. It is now stated that the scrap alone which has been seized up to date amounts to 300,000 tons, while the semifinished steel is estimated at 100,000 tons, and the finished steel between 600,000 and 800,000 tons. The advice of various commerical organizations as to the best method of disposing of these

(Continued on page 975)

Western Demand Is Slack

Light Call for Iron and Steel with Exception of Wire and Tubular Goods—Competition Causes Shading of Intercostal Rates

SAN FRANCISCO, Sept. 29.—Demand for iron and steel products in the local market, with the exception of wire products and tubular goods, has been confined to unimportant tonnages during the past week. While construction activity and general business conditions are good, consumers and distributors are buying only for immediate requirements and the expected fall buying movement has not yet developed.

It has been estimated that it will require in the neighborhood of 5,000,000,000 feet of lumber for the rebuilding of the devastated areas of Japan. That the Pacific Northwest will come in for a large share of this business within the near future is almost certain.

New entries of steamship companies in the intercoastal trade has brought the total number of companies engaged in this business to over 12. The number of vessels now in operation exceeds 100. As a result, competition for existing business is becoming keener and during the past few days several companies have been seeking business at 35 cents instead of the 40-cent conference rate.

Pig Iron and Coke

The fall buying of pig iron has not yet begun. The market at the present time is lifeless and with the exception of a few scattered sales and inquiries for small spot lots, nothing of importance is up before the trade. With southern iron now being quoted as low as $21, base Birmingham, the domestic material has again become a factor in this market. Foreign iron is being quoted around $32 duty paid c.i.f. coast ports in large lots while spot material is bringing as high as $37.

Bars, Plates and Shapes

Merchant bar business is of small proportions and the outlook is far from encouraging. Recently several hundred tons of foreign material has been sold in the Northwest at prices considerably under the domestic figure. The bulk of the bar business on the coast at present calls for concrete bars and a fair volume of this closs of material is being booked.

Interest in the plate market here is centered around the Bull Run pipe line job, up for figures on Oct. 3, involving 17,000 tons of material. This is the only inquiry before the trade, no new inquiries for oil storage tanks having been issued for several weeks. Prices range from 2.60c to 2.70c Atlantic seaboard equivalent to 2.90c to 3.10c depending upon whether the 30 or the 40-cent water rate is obtained.

A much better situation exists in the structural market and fabricators have all the work they can attend to for several months. Several companies have refused to quote on new business in the last week or so. Awards this week totaled over 1500 tons. Due to financial difficulties the Union Construction Co., Oakland, has been forced to release the award they secured for 1000 tons for buildings for the Columbia Steel Corp., Provo, Utah and Dyer Bros. Structural Steel Co., now has the contract. This same company also secured the contract for the Elks building, San Francisco, originally awarded to the Golden Gate Iron Works but recently rescinded.

Other Finished Material

Consumers and distributors are pursuing a policy of buying only for immediate requirements with the result that new business is of meager proportions. Prices, however, are firm at 3.00c, 3.85c and 5.00c base Pittsburgh for blue annealed, black and galvanized sheets respectively.

The Southern Pacific Co. has closed on its inquiry for 10,000 kegs of track spikes and 2100 kegs of track bolts. The United States Steel Products Co. secured 500 tons girder rails for the Los Angeles Harbor commission. Opening of bids for 1000 tons of rail for the Eureka, Cal., Municipal railway was postponed until Oct. 3.

Demand for cast iron pipe from private sources continues quiet but some fair tonnages have been placed and are up for figures for municipalities the largest pending inquiry being for 5200 tons for Los Angeles. Prices remain unchanged at approximately $59 a ton delivered.

Soil pipe stocks on the coast are low and little buying has been done. The Berkeley fire has stimulated this market to a marked degree and it is understood that several jobbers are now at work making up new specifications to take care of the demand that will come from this source in the near future.

Tubular goods continue in heavy demand. This market has for many months been by far the most active of all the steel products on the coast and from present indications will so continue. Heavy demand for standard pipe for the reconstruction of the Berkeley fire area is expected, and distributors in this district are pressing for deliveries. It is reported that the Los Angeles Gas Co. has placed 25 miles of 6-inch and 25 miles of 8-inch plain end pipe involving 3525 tons. Another southern interest has placed 450 tons of 8-inch plain end pipe.

Northwest Building Active

SEATTLE, Sept. 29.—Continued construction activity has been the outstanding feature of the iron and steel market during the week. Several notable projects have been announced in Seattle and vicinity.

The Metropolitan Building Co. made public its plans for the immediate construction of a modern 6-story office structure, costing $1,250,000. The Bank of California will proceed at once with the construction of its home building to cost $225,000.

Pig Iron and Coke

No marked change has taken place. Buying continues on a limited scale, consumers purchasing only for immediate requirements. Local dealers have sufficient iron in stock to meet the demand. Glengarnock is still quoted at around $36. For later delivery buyers report they can shade this price but consumers are not looking far ahead as they bought heavily earlier in the year.

The coke situation is featureless. There is a fairly steady movement to meet the requirements of consumers. Imports of coke from Fernie, B. C., are up to normal, this grade being used together with local coke here and in Oregon. Prices are stationary.

The movement of bars, plates and shapes continues satisfactory although the market lacks outstanding features. Tonnages, as a rule, are small but the total shows a gain over last month. Jobbers report a good demand for bars and shapes while plates are showing increased activity. The steel mill is operating on the same scale with considerable work on the books. Prices are unchanged.

Other Finished Material

Representatives of eastern mills state that business is quiet. Jobbing houses have large stocks on hand and they are not inclined to make additional purchases for arrival prior to inventory. Jobbers have considerable corrugated material en route to replenish the stocks which were rushed from here to Japan for relief purposes. In other respects stocks are in good shape. Lumber and logging companies are buying constantly as they are operating to full capacity. Jobbers have not changed steel prices but in line with the new manufacturers' list they have revised machine bolts to 40 off instead of 30 and carriage bolts from 30 to 35 off.

Old Material

There is a better tone to the steel scrap market and prices have firmed a trifle. Good scrap is now quoted at $12 per net ton as against $12.50 a gross ton which has been the going price for several weeks. Supplies are short and an abrupt advance is expected should a sudden demand appear. There is no change in cast iron which is quoted at $20 to $22 according to grade. While there has been no export inquiry, scrap dealers believe they will participate in any extensive buying movement which Japan may undertake. However, this foreign demand is not expected to materialize for some time.

Steel Foreign Trade Falls Off

August Imports and Exports of Iron and Steel Decline From July Figures—Shipments from United States Total 144,419 Tons as Compared to 171,142 Tons in July—Pig Iron and Ferroalloy Imports Show Drop

UNITED STATES foreign trade in iron and steel in August aggregated the lowest total tonnage for any month since 1922, according to figures just issued by the United States department of commerce. Exports in August totaled 144,419 tons, a drop of 26,723 tons from the total of the previous month. This was the smallest monthly total shipment from the United States for any month since February when exports totaled 136,853 tons. Imports fell from 53,451 tons in July to 45,112 tons in August, the smallest since June 1922 when the iron and steel products received in this country aggregated 39,154 tons.

IMPORTS AND EXPORTS
Gross Tons

	1923		1922	
	Imports	Exports	Imports	Exports
Jan.	119,955	135,046	13,404	165,962
Feb.	67,682	136,853	11,535	133,333
March	106,050	168,176	12,774	206,474
April	77,794	183,905	18,720	197,562
May	75,840	195,535	23,098	229,616
June	67,968	176,403	39,154	216,298
July	53,451	171,142	56,425	161,204
Aug.	45,112	144,419	49,054	144,264
Sept.	.....	.....	76,393	128,370
Oct.	.....	.....	184,202	131,542
Nov.	.....	.....	152,250	124,004
Dec.	.....	.....	96,358	154,087
Total	641,976	1,311,372	733,367	1,992,716

Year	Imports	Exports
1921	135,825	2,150,276
1920	421,274	4,934,087
1919	322,264	4,397,295
1918	169,110	5,338,019
1917	330,201	6,465,053
1916	328,965	6,110,732
1915	282,396	3,532,564
1914	289,775	1,549,554
1913	317,260	2,745,635

Exports for the eight months ended Aug. 31 1923, totaled 1,311,372 tons as compared to 1,340,089 tons for the like period of 1922, and as compared to 1,992,716 the total for the entire year of 1922. Imports for the eight-month period just ended aggregated 641,976 tons compared to 2,333,306 tons for that period of 1922 and 733,367 tons for the year 1922.

Pig iron, plates, structural forms, and light rails established considerable increases in August exports over July figusers. Light rails in July shipped from the United States totaled 1058 tons as compared to 3241 tons in August. Decreases from the July shipments were registered in the following classifications: Steel bars, galvanized sheets, tin and terne plate, plain structural shapes, rails over 50 pounds, galvanized wire, barbed wire, etc. Tin and terne plate shipments in August totaled 5995 tons as compared to 13,029 tons in July and 4095 tons in August, 1922. Barbed wire shipments fell from 7731 tons in July to 4756 tons in August, which was also lower than the 6829-ton total shipped from this country in August, 1922.

IRON AND STEEL EXPORTS
Gross Tons

	—August—		Eight months ending August	
	1923	1922	1923	1922
Pig iron....	3,117	1,791	20,928	17,564
Scrap	13,662	4,105	39,533	53,462
*Semifinished	645	786	70,563	67,803
Iron bars..	319	....	10,684	.....
Steel bars...	117	5,437	111,124	22,862
Alloy steel bars	635	....	1,665	.....
Wire rods..	1,548	980	19,653	35,115
Boiler plate.	416	324	5,717	11,188
Other plates	8,169	5,905	78,141	60,499
Galvanized sheets	6,943	8,797	73,768	83,030
Black sheets, steel	5,781	6,290	69,189	188,661
Black sheets, iron	1,608	1,627	10,216	8,589
Cold rolled strips	984	423	8,775	3,242
Hoops, bands and scroll..	2,135	1,909	17,734	19,214
Tin and terne plate	5,995	4,095	71,332	53,548
Structural shapes plain	14,165	7,698	91,026	36,805
Structural shapes fabricated	2,282	2,205	20,125	14,403
Ship and tank plates, punched and shapes	175	328	2,189	1,589
Other structural forms.	5,170	8,622	27,666	50,970
Metal lath..	120	**	798	**
Rails, over 50 pounds	19,477	17,416	147,403	183,668
Rails under 50 pounds.	3,241	237	17,647	18,340
Rail joints, etc.	1,446	892	15,000	14,196
Switches, frogs, etc..	374	549	3,193	3,868
Railr'd spikes	1,003	714	6,202	5,171
Railr'd bolts, nuts, etc...	244	117	1,660	1,484
Boiler tubes.	1,671	1,149	11,072	7,702
Casing and oil line pipe	6,562	2,290	38,766	31,791
Welded black pipe	6,471	4,980	52,816	49,891
Welded galvanized pipe	2,874	2,685	19,259	21,079
Malleable iron pipe fittings	913	739	5,187	5,514
Cast iron pipe	1,266	1,186	9,779	11,826
Cast iron pipe fittings	1,221	911	8,118	5,474
Plain wire..	2,601	3,677	24,743	25,506
Galvanized wire	2,089	4,327	32,463	61,340
Barbed wire	4,756	6,829	51,953	47,447
Woven wire fencing ...	254	214	2,936	1,782
Wire cloth and screening	303	166	1,166	943
Wire rope..	465	388	4,504	2,989
Insulated wire and cable	130	64	1,024	616
Other wire..	1,368	1,251	10,144	11,317
Cut nails...	113	195	1,770	2,775
Wire nails..	3,245	2,355	26,116	44,516
Horseshoe nails	88	52	835	465
Other nails.	559	315	3,511	2,744
Bolts, nuts, rivets, etc..	1,614	1,466	12,667	12,000
Horseshoes	48	113	596	598
Other iron and steel..	5,953	4,233	46,139	35,242
Ferromanganese and spiegeleisen	....	76	3,220	984
Ferrosilicon.	84	28	657	277
Total	144,419	120,336	1,311,372	1,340,089

*Includes ingots, blooms, billets, slabs and skelp, sheet and tin plate bars.
**Due to reclassification, comparisons are not possible.

Pig iron imports dropped 5196 tons from the July figure of 19,760 tons, 14,564 tons being received by the United States in August. This total is lower also than that of August, 1922 when 17,105 tons was received. Shipments of pig iron in August totaled 3117 tons, an increase of but 121 tons over the shipments of 2966 tons in July but almost double the 1791 tons shipped in August 1922. The shipments for the eight months ended August 1923 totaled 20,928 tons, as compared to 17,564 tons for the like period of 1922. Imports for the eight months just ended were 328,464 tons as compared to 62,332 tons for the same time in 1922.

CASTINGS AND FORGINGS EXPORTS
Gross Tons

	—August—		Eight months ending August	
	1923	1922	1923	1922
Iron castings...	767	895	6,802	6,877
Steel castings..	474	182	3,303	1,374
Car wheels and axles	1,839	1,051	13,303	11,504
Iron and steel forgings	253	135	2,120	1,802
Total	3,333	2,263	25,528	21,557

FERROALLOY EXPORTS
Gross Tons

	—August—		Eight months ending August	
	1923	1922	1923	1922
Ferrosilicon ...	84	28	657	277
Ferromanganese and spiegeleisen	.....	76	3,220	984
Tungsten, manganese and other ores....	25	.....	698	.....
Ferrotungsten, tungsten metal and wire..	175	.....	2,402	.....
Ferrovanadium.	.....	1	10	19
Other ferroalloys	4	25	92	509

Scrap imports in August amounting to 9900 tons was but a small increase over the 9085 tons shipped in the same month last year, although the total for the eight months this year totaling 140,762 tons is far ahead of the 47,863-ton total for that period last year.

Exports of rails in August amounted to 22,718 tons as compared to 17,653 tons for the same month of 1922 and to 24,521 tons in July. Exports of that product for the eight months ending in August this year totaled 165,050 tons as compared to 202,008 tons for the same period of last year. Imports of rails in August totaled 4449 tons as compared to 726 tons in the same month of 1922 and to

1127 tons for July. Imports for the eight months of 1923 amounted to 20,100 while in the same period of last year 21,161 tons was imported.

England led in August again as an exporter of pig iron to the United States, shipping a total of 6036 tons to this country in that month. In July, 9554 tons was received from England. British India shipped 5062 tons to the United States in August, while the Quebec-Ontario district of Canada sent 2375 tons

PIG IRON IMPORTS

Gross Tons

From:	Aug., 1923
France	595
Sweden	120
England	6,036
Scotland	100
Quebec-Ontario	2,375
Mexico	1
British India	5,062
China	275
Total	14,564

IRON ORE IMPORTS

Gross Tons

From:	August 1923	August 1922	Eight months ending August 1923	Eight months ending August 1922
Spain	.....	7,328	184,000	28,197
Sweden	52,523	61,304	599,082	185,952
Canada	369	87	23,379	1,408
Cuba	96,650	54,948	527,001	199,489
Other countries	118,135	36,506	702,073	130,503
Total	267,677	171,142	2,035,535	545,549

and France sent 595 tons, the remaining pig iron imports being from countries sending less than 150 tons each.

Imports of iron ore in August totaling 267,677 tons was 96,535 tons more than the amount received in the same month last year when 171,142 tons was imported, and considerably less than that of July when 439,367 tons was landed in American ports, Of the August 1923 total, 52,523 tons came from Sweden, 369 tons from Canada, 96,650 tons from Cuba and 118,135 tons from other countries. The total amount received for the eight months ending August 1923

IRON AND STEEL IMPORTS

Gross Tons

	August 1923	August 1922	Eight months ending August 1923	Eight months ending August 1922
Pig iron	14,564	17,105	328,464	62,332
Ferromanganese	6,845	15,959	64,894	69,093
Ferrosilicon	489	8,910	8,912	9,159
Scrap	9,900	9,085	140,762	47,863
Bar iron	1,201	619	6,264	3,909
Steel ingots, bars, etc.	3,578	3,904	12,627	14,937
Structural shapes	1,389	356	7,464	1,598
Rails	4,449	726	20,100	21,161
Boiler and other plates	828	.....	1,312	.....
Sheets and saw plates	740	.....	1,693	.....
Tin plate	160	66	9,630	2,186
Wire rods	59	94	2,195	1,068
Total	44,202	56,824	604,317	233,306

OTHER IMPORTS

Gross Tons

Tubular products	285	**	31,027	**
Round iron and steel wire	205	**	2,755	**
Castings and forgings	233	**	2,030	**
Nails and screws	107	**	2,030	**
Bolts, nuts, rivets, etc.	22	**	150	**
Flat wire and strip steel	58	**	814	**
Grand total	45,112	56,824	641,976	233,306

**Due to changes in classification, comparisons are not possible.

was 2,035,535 tons as compared to 545,549 tons for the like period of 1922.

Ferroalloy and various ore imports in August amounted to 25,142 tons as compared to 80,662 tons of August 1922, while the total for the eight months of 1923 was 197,161 tons as compared to 344,891 tons for the same period last year.

Of the total of 16,984 tons of manganese ore imported into the United States in August, the outstanding item was the receipt of 7390 tons from British West Africa.

The Cortland Grinding Wheel Corp., manufacturer of abrasive wheels at Chester, Mass., will open an office in Cleveland early in October.

To Readjust Finances

A committee of stock and note holders of the Hydraulic Steel Co., Cleveland, has been appointed to devise a plan for readjusting the financial structure of the company. The meeting of stockholders and others was arranged by officials of the company. In a letter to stockholders officials of the company point out that losses reported for 1921 and 1922 continued

FERROMANGANESE AND MANGANESE ORE IMPORTS

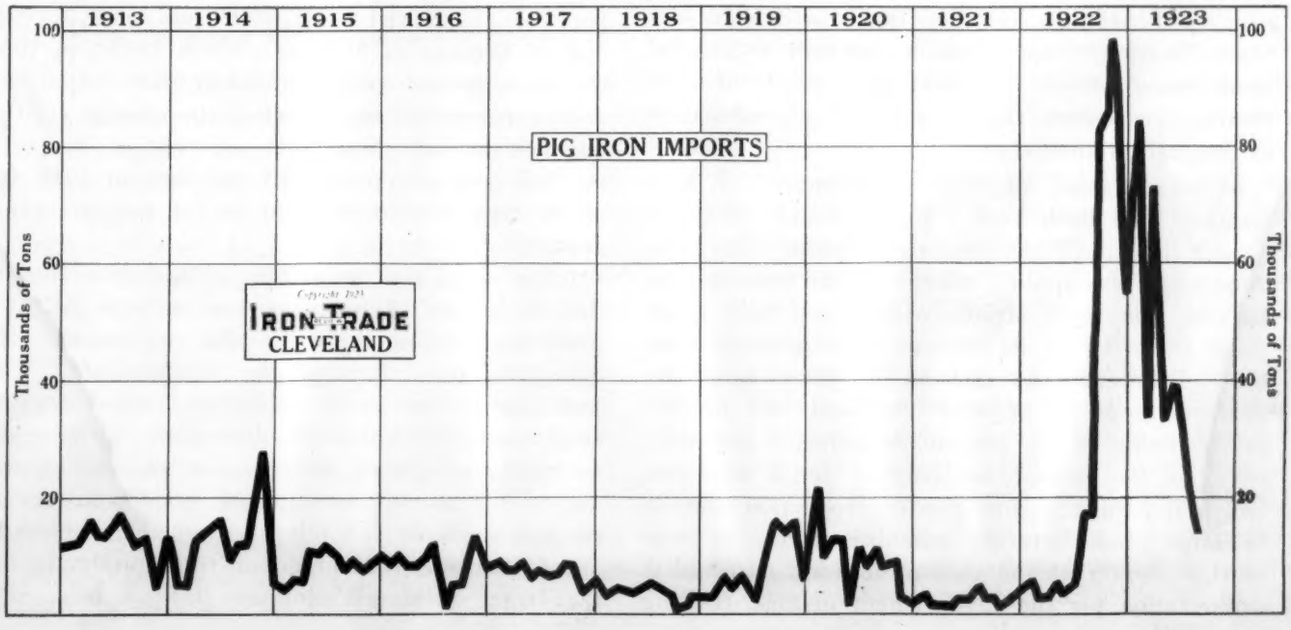
Gross Tons

	Aug., 1923
Manganese ore from:	
Russia-in-Europe	2,935
Panama, including canal zone	400
Brazil	3,560
Chile	269
British India	2,430
British West Africa	7,390
Total	15,984
Ferromanganese from:	
France, including Luxemburg	10
England	6,835
Total	6,845

IMPORTS OF VARIOUS ORES AND FERROALLOYS

	August 1923	August 1922	Eight months ending August 1923	Eight months ending August 1922
Ferromanganese	6,845	15,959	64,894	69,093
Ferrosilicon	489	2,083	8,912	9,159
Manganese ore	16,984	62,121	118,176	272,868
Tungsten bearing ore	.....	499	.....	1,571
Nickel ore	824	.....	5,179	.....
Total	25,142	80,662	197,161	344,891

until the end of the first quarter of the current year, although for the last five months the company's position has steadily improved. Earnings from April 1 to Sept. 1, 1923, have been more than sufficient to provide for interest on the company's notes. In this period cash has increased $54,414, while current liabilities have been reduced $455,232, bank loans were cut down by $262,074 and accounts payable were reduced $193,157.



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IN THIS ISSUE

October 4, 1923

	Page
Iron and Steel Market Review	915
Iron and Steel Markets	916 to 928
Iron, Steel and Scrap Prices	919, 982, 986, 990
September Pig Iron Production	930
Germans Make Sales to Japan	931
Foreign Markets	931, 932, 975
Editorials	936, 937
October Outlook Is Improved	938
Business Trend	939 to 942
Heat Treating—Its Principles and Applications	943
War Aided Art of Heat Treating	947
Rise of Steel Treaters Is Rapid	951
Pittsburgh Greets Steel Treaters	956
Show Will Reflect 1923 Progress	958
Analyze Electric Power Problems	966
Air Electric Brass Furnace Problems	969
Many See Exhibits of Machine Tools	970
"Real" Wages at New High Level	976
New Trade Publications	976
Machinery Sales Show Increase	978
Construction and Enterprise	980

Has Served Industry Well

NEXT week the minds of many executives in the metal working industries will be turned toward problems of heat treating by virtue of the convention and exposition to be held in Pittsburgh by the American Society for Steel Treating. The attention that will be focused upon these events and upon the subject of steel treating represents the outcome of a combination of unusual circumstances.

Although some of the fundamentals of heat treating have been known for thousands of years, it was not until the twentieth century that the knowledge was applied effectively and consistently. In fact, the rapid strides with which heat treatment advanced to its present high position were barely noticeable as late as 10 years ago. By 1914, methods of thermal treatment had become indispensable to the automobile industry and were attracting the interest not only of forge shop men and tool hardeners, but also of production officials in large manufacturing establishments. It was at this point that the idea of forming a technical organization for the advancement of heat treating was conceived. In a short time two "treating" societies had been formed, but the disadvantage of having rival institutions in the same field was so apparent that little time was lost in merging the organizations into a single body, known as the American Society for Steel Treating.

The rapid growth of this society, outlined elsewhere in this issue, has been due not only to the marked advance in the importance of heat treating to industry, but to the interest in the technical and practical phases of the subject manifested by its members. This interest has been inspired and maintained through the workings of the "chapter" plan of organization, which the officers of the society wisely adopted.

So successful have been the efforts of this young technical body that industry in all fairness must credit it with having contributed liberally to the advancement of one of the most important branches of the technology of manufacturing.

Steel Corporation Holds Its Own

PRODUCTION by the United States Steel Corp. in 1922 supplied a less proportion of the total output of iron and steel of the country than in 1921, but on the whole it was on about a normal basis considering other recent years. This fact is shown from a study of the official manual statistical report of the industry just received. The steel ingots and castings produced by the leading interest in 1922 represented 45.2 per cent of the country's total. The previous year its production constituted 55.4 per cent and for the two years preceding that, a 47.7 per cent average. In 1919 when the country's total production of steel was only a little less than that of 1922, the Steel corporation's contribution was 49.6 per cent. Of all the pig iron made last year the Steel corporation furnished a supply of 44.2 per cent compared with 52.02 per cent in 1921 and an average of 41.7 per cent in 1919 and 1920, the other prewar years. Finished steel output, the real measure of the Steel corporation's relative business activity, was 42.9 per cent of the total in 1922 compared with 50.5 per cent in 1921 and an average of 42.6 per cent in the two preceding years.

It is apparent from the comparative figures that in a time of lean business such as 1921 the Steel corporation is better able to maintain its operations than those of the independents. This probably is due to its established relations with large consumers, its more diversified capacity and its highly integrated position. In 1921 which was one of the worst years in the modern history of the steel industry, all things considered, it is to be noted that the percentage of total production of the larger producers' tonnage in pig iron, steel

ingots and castings and rolled finished steel was largely in excess of 1922 and also of 1919 and 1920. In fact, in pig iron, this proportion was the largest ever known, in finished steel it was nearly a high record and in steel ingots and castings it was the largest since 1909.

Some further interesting comparisons of the position of the Steel corporation are made possible by the report just issued. In 1922 the largest interest shipped 45.47 per cent of the iron ore from the Lake Superior region and produced 45.77 per cent of that of the whole country. In 1921 these figures were 62.43 and 56.08 per cent respectively; in 1920 they were 41.83 and 39.97 and in 1919, 45.94 and 42.05 per cent respectively. Last year the Steel corporation supplied 35.66 per cent of all the coke made against 38.85 per cent in 1921, 31.57 per cent in 1920 and 34.50 per cent in 1919.

Of the steel rails made in 1922, 56.01 per cent came from the Steel corporation mills; of structural shapes, 46.48 per cent; of plates and sheets, 48.10 per cent; of wire rods, 49.9 per cent; of wire nails, 45.08 per cent; of tin plate and terne plate, 52.03 per cent and of all other finished products, 59.8 per cent. As pointed out, this record was considerably under that of 1921 when the percentages were 68.19 in steel rails; 47.52 in structural shapes; 46.56 in plates and sheets; 55.06 in wire rods; 48.07 in wire nails; 48.91 in tin and terne plate and 49.83 in other finished products. In 1920 the figures were 58.09 per cent in steel rails; 43.86 per cent in structural shapes; 39.82 per cent in plates and sheets; 56.03 per cent in wire rods; and 53.98 per cent in wire nails.

The general conclusion to be drawn from the statistics for 1922 is that the Steel corporation held its own in its competition against the independents better than in other postwar years, even without considering the extraordinary period of 1921.

Real Wages Highest in History

A COMPARISON made by the National Industrial Conference board between cost of living and wages, showing that "real wages" of industrial workers, or the purchasing power of their wages, is greater today than ever before, reflects conditions of a very prosperous character.

One of the principal factors that have made this possible has been the continuity of employment in the majority of the country's basic industries, with a maintenance of wages at a high level. Reductions made in some cases from the "peak" figures have been taken up by recent advances, while in many instances wages have not been cut at all, but have shown a steady rise. These developments coming about at a time when prices of food, clothing and some other items entering into the workingman's family budget, have decreased, as against the high point in recent years, has given him a margin of money available for savings or the purchase of luxuries never before known in the history of the country.

The analysis as made by the conference board's economists is of great significance, because national welfare and prosperity are founded on the steady employment and the purchasing ability of the mass of workers. A famous economist once said that purchases made by the ordinary run of wage earners in the "chain" stores, or in those handling moderate priced merchandise, were in his opinion one of the best business barometers that this country affords, and are more sensative as an indicator of current conditions. With the wage earners "better off" today than they were during any so-called "peak" periods of recent years, this barometer should show a gratifying response.

In the board's report, the comparison is made as of July with respect to the cost of living and wages. This is the first time in nine years when the compilations have been made concurrently, so as to afford a check of both sets of figures at the same time. The "real" hourly earnings were 40 per cent above the 1914 level, and the "real" weekly earnings 35 per cent higher. The principal item in the cost of living causing some concern to the investigators is that of rentals, the average of which shows a continual rising tendency.

The force of the analysis is that the average American wage earner is pretty well off under present conditions and has small cause for general complaint.

Seeking Its Own Level

ACCORDING to the annual statistical report just published by the American Iron and Steel institute, the annual capacity in steel ingots and castings for 1922 was 58,644,655 or only about a quarter of a million tons more than in 1921. This slight gain represents the difference between an increase of more than a million tons in open-hearth capacity and the losses in bessemer, crucible and electric furnace capacity.

Although the reduction in electric furnace capacity amounts to only 27,560 tons, it is significant in that it is a continuation of a slight decline that has been taking place since 1920, when the annual capacity of 1,249,645 marked the high point in the history of electric steelmaking. Friends of the electric furnace process may well ponder over the diminished capacity in 1922. Perhaps the explanation lies in the fact that demands of war gave the electric furnace industry an artificial growth in 1918, 1919 and 1920. With this favorable influence removed, electric steel melting was obliged to shift for itself. It may be expected that once it finds its level, the upward trend again will be resumed.

October Outlook Is Improved

Some Autumn Expansion Now Is Appearing—Prospect of New Buying Movement by Railroads Represents Constructive Development—Advance of Wheat Is Favorable—Farmer Outlook Is Better

BY JOHN W. HILL, FINANCIAL EDITOR

THE first week of October has brought evidence that business is destined to have some autumn expansion. The failure of trade to bound forward at the crack of a pistol on a stated date in September spread uncertainty in many lines of industry and in the financial markets as well. Now it is being made known the railroads are to begin, shortly, a broad buying movement of cars. That should quicken the pulse of the steel trade, and help to correct some of the excessive apprehension in the general situation. This tangible development dovetails perfectly with the recent statements of leading steel executives expressing confidence in the outlook.

Those who cling to the standard of last spring's boom as the proper measure of good business likely will continue under a cloud of disappointment. Nothing has happened to indicate that a great boom is impending. Buyers lack the impulse to fling conservatism to the winds. Stocks of goods are ample, freight deliveries are free and price levels are fairly stable. A healthy not a bearish, autumn business seems in store for the remainder of the year.

The test of the price level has yet to be met. General commodity prices and these of iron and steel turned down last spring. They continued to fall gradually until August, when stabilization appeared. Wholesale commodity indices now stand from 40 to 50 per cent above 1913. IRON TRADE REVIEW's composite average of 14 iron and steel products, pictured in the Business Trend, is now about 69 per cent above 1913. In view of heavy outputs in most lines higher prices are not immediately in prospect. Competition of sellers may force some further reactions. This has happened in tires, copper, and in automobiles. In iron and steel finished steel has continued strong in contrast with the weakness of pig iron. Under present conditions, however, the final judgment upon prices rests with the consumer since in many lines the present is a buyers' market.

Advances in cotton and wheat have been spectacular price developments. Cotton has risen 35 per cent within a few weeks because crop prospects are below estimated world needs of American cotton. Wheat has gone 11 cents above its low point for the year. This is correcting in part the wheat growers plight. As shown by the Business Trend most leading crops yields are good. Moreover values are higher than last year. The spread between general commodities and farm prices is dwindling. One year ago it was 18 per cent and now it is 8 per cent. This means higher purchasing power for the farmer and is one of the strongest factors in the outlook for fall trade.

Index to Business Trend Charts

THIS ISSUE

Subject	Page
Iron and Steel Price Index	939
Freight Car Situation	940
Railroad Freight Traffic	940
Security Prices	940
Bank Clearings	941
Cotton Consumption	941
Copper Prices	941
American Crop Production	942

REFERENCES

Aberthaw Index	Sept. 27
Electric Power Production	Sept. 27
Farmer Purchasing Power	Sept. 27
Foreign Trade	Sept. 27
Independent Sheet Situation	Sept. 27
Monthly Coke Output	Sept. 27
Structural Awards	Sept. 27
Automobile Production	Sept. 20
Building Construction	Sept. 20
Business Index	Sept. 20
Foreign Exchange	Sept. 20
Monthly Ingot Production	Sept. 20
Prices and Failures	Sept. 20
Steel Orders	Sept. 20
Car Orders	Sept. 13
Coal Production	Sept. 13
Dollar Purchasing Power	Sept. 13
Monthly Incorporation	Sept. 13
Monthly Pig Iron Production	Sept. 13
Railroad Earnings	Sept. 13
Building Cost Index	Sept. 6
Foundry Pig Iron Market	Sept. 6
Iron and Steel Foreign Trade	Sept. 6
Iron and Steel Price Parity	Sept. 6
Steel Castings Bookings	Aug. 30
Monthly Commodity Prices	Aug. 9
Steel Earnings	Aug. 9
Monthly Alien Migration	July 12
Steel Output Per Capita	July 5
Wholesale Trade	June 21
State of Credit	June 14
Wage Factor	June 14
112 Years of Prices	May 3
Freight Factor	April 19
Wages and Living Cost	April 5
Iron and Steel Production Rate	Feb. 1
Long Time Trend of Wages	Aug. 3

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One mo. ago	One year ago	Average 1913
Business failures	357	296	315	375	...
Cash ratio Fed. Res. System	76.4	77.2	77.5	78.4	...
Loan rate, 4-6 Mo. N. Y. (per cent)	5-5¼	5-5¼	5	4¼-4½	5¼
Aver. 25 ind'l shares	$100.93	$101.60	$106.67	$111.25	$58.19
Average 25 rail shares	$56.60	$57.18	$58.11	$68.53	$82.97
Aver. 40 bonds	$75.59	$76.32	$76.88	$81.28	$93.00
Car loadings (week ended Sept. 15)	1,060,580	928,858	1,035,741	945,919	*991,166
Bank debits 246 cities (000 omit'd)	$8,838,994	$9,749,127	$8,182,305	$8,531,830	.....

*1920

FOREIGN EXCHANGE (Demand)

	Normal	Sept. 24 (close)	Week before	Month ago	Year ago
Sterling	$4.86	$4.53	$4.56	$4.54	$4.37
Francs	19.3c	5.93c	6.18c	5.62c	7.56c
Lira	19.3c	4.48c	4.61c	4.25c	4.23c
Marks	23.8c	0.0000004c	0.0000007c	0.00001c	0.06c

MONTHLY COMPARISON

	August	Month before	Year ago	Monthly average 1913
Dodge building Awards in 36 states	$298,629,000	$315,025,000	$350,000,000	$82,126,000
Business failures: Number	1319	1231	1714	1336
Liabilities	$34,334,722	$35,721,188	$40,279,718	$22,732,000
Exports	$313,000,000	$303,030,000	$301,000,000	$207,000,000
Excess of gold imports	$30,636,000	$27,406,000	$18,136,355	†630,716
Bureau of Labor Price Index	150	151	155	100
Bradstreet's Price Index	139.7	138.7	130.7	100
Economist's British Price Index	4188	4182	4257	2717
Cost of Living Index	161.6	161.9	154.5	100
New incorporations	$335,462,000	$724,920,000	$646,605,000	$172,301,000
Railroad net earnings	*$84,591,400	$87,742,000	$69,321,000	$59,900,000

*July. †Monthly average excess exports.

The Business Trend

October 4, 1923

TRADE TODAY, TOLD BY IRON TRADE CHARTS

GENERAL SITUATION—General trade continues to respond to seasonal influences without feverish haste. Some lines lagging, but industry in the main shows a healthy undertone, with strong finances and generally moderate inventories; some letdown in industrial activities and easier labor situation probable this winter.

IRON AND STEEL PRICES—Iron Trade Review composite of 14 iron and steel prices continues at the near-staple level it has maintained for weeks; average 69 per cent above 1913, down 7 per cent from year's peak.

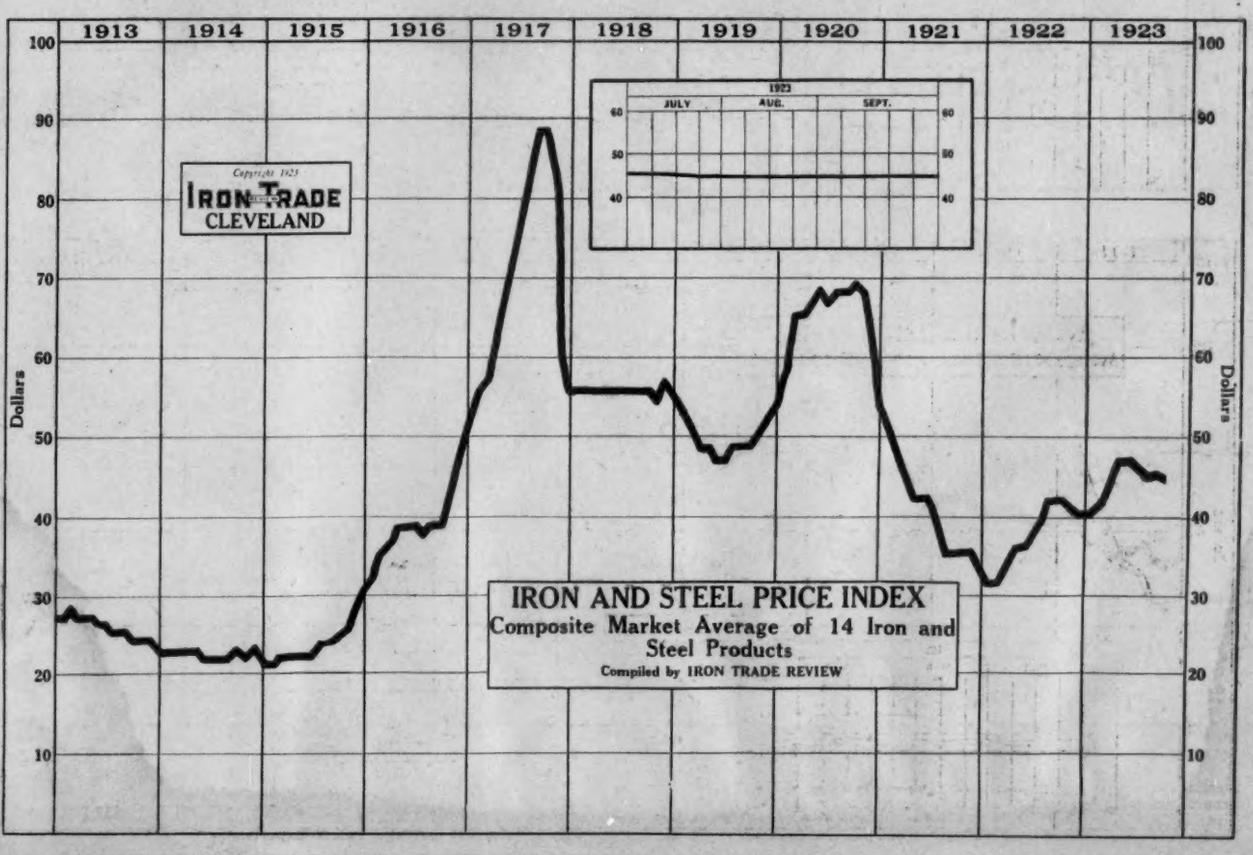
FARM YIELDS—Estimated outputs of many leading crops above last year and 5-year average; wheat is exception; corn crop one of biggest in history; purchasing power of four leading cereals 21 per cent over 1922.

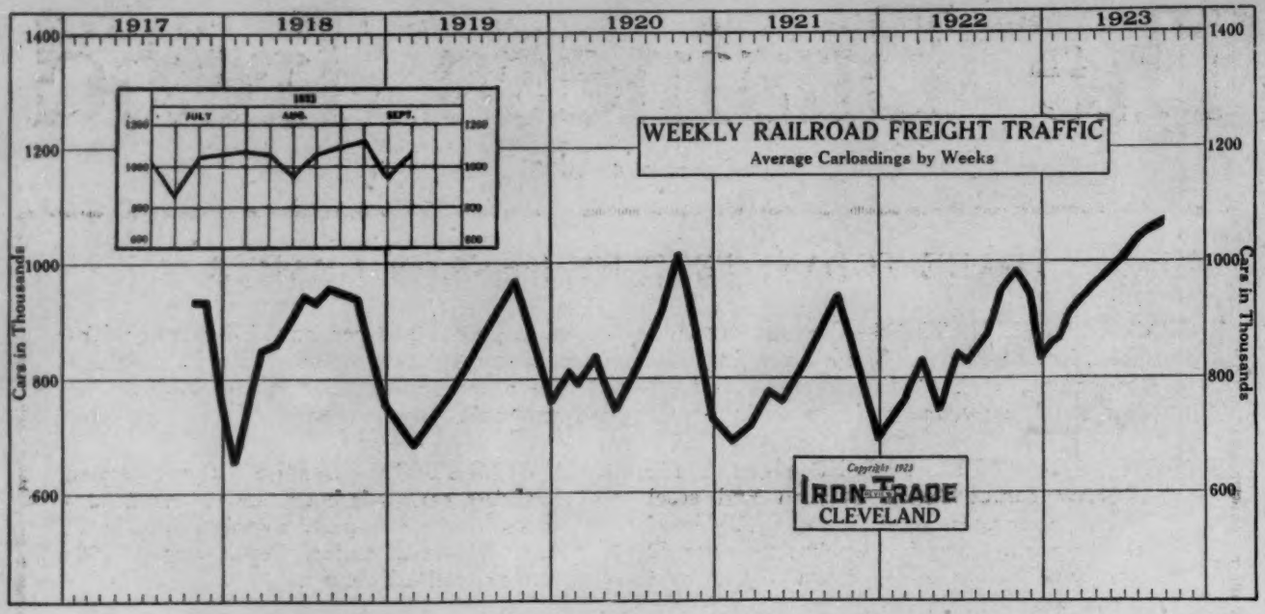
FREIGHT TRAFFIC—Car loadings cross 1,000,000 mark for thirteenth week this year in the week ended Sept. 15; in 1920, previous peak traffic year, this happened in only five weeks.

CAR SITUATION—Despite unprecedented loadings railroads continue to avoid congestion; the net daily average surplus of cars in week ended Sept. was 57,000; reflects rail efficiency.

COPPER PRICES—Prospects for European settlement rouses some interest in metals; copper price continues weak, however, as foreign buying on large scale is expected to come slowly.

SECURITIES—Stock market movements have been confused without well defined trend; halting actions of shares in September reflected some disappointment over failure of trade to swing into boom stride.

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WEEKLY RAILROAD FREIGHT TRAFFIC
Average Carloadings by Weeks
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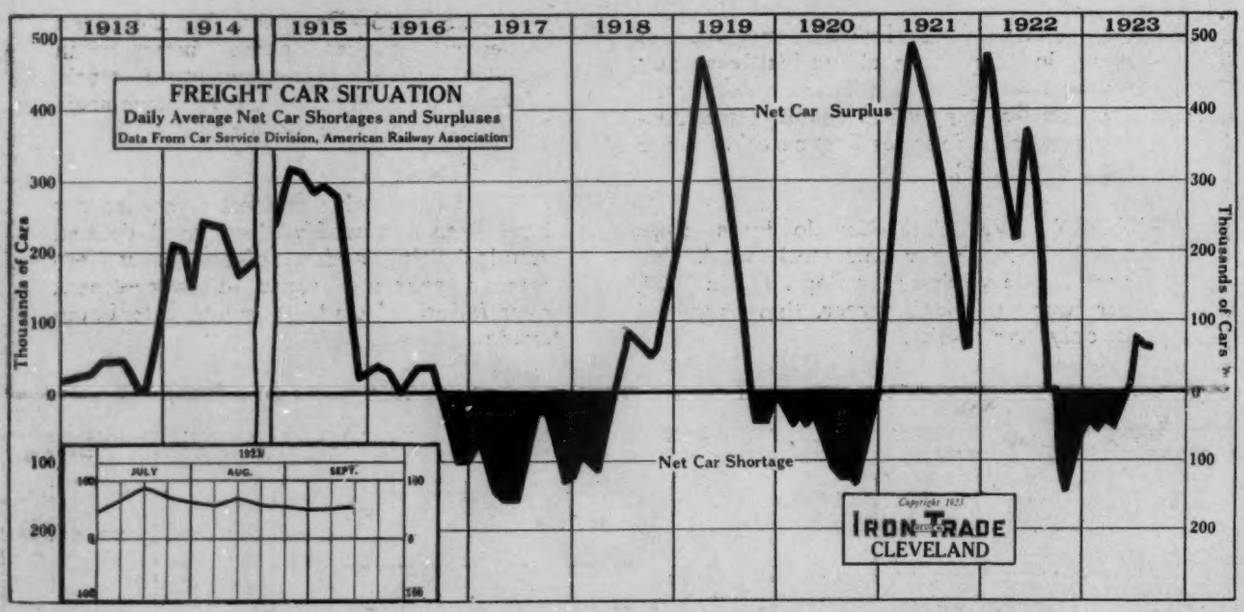
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Thousands of Cars
FREIGHT CAR SITUATION
Daily Average Net Car Shortages and Surpluses
Data From Car Service Division, American Railway Association
Net Car Surplus
Net Car Shortage
1923
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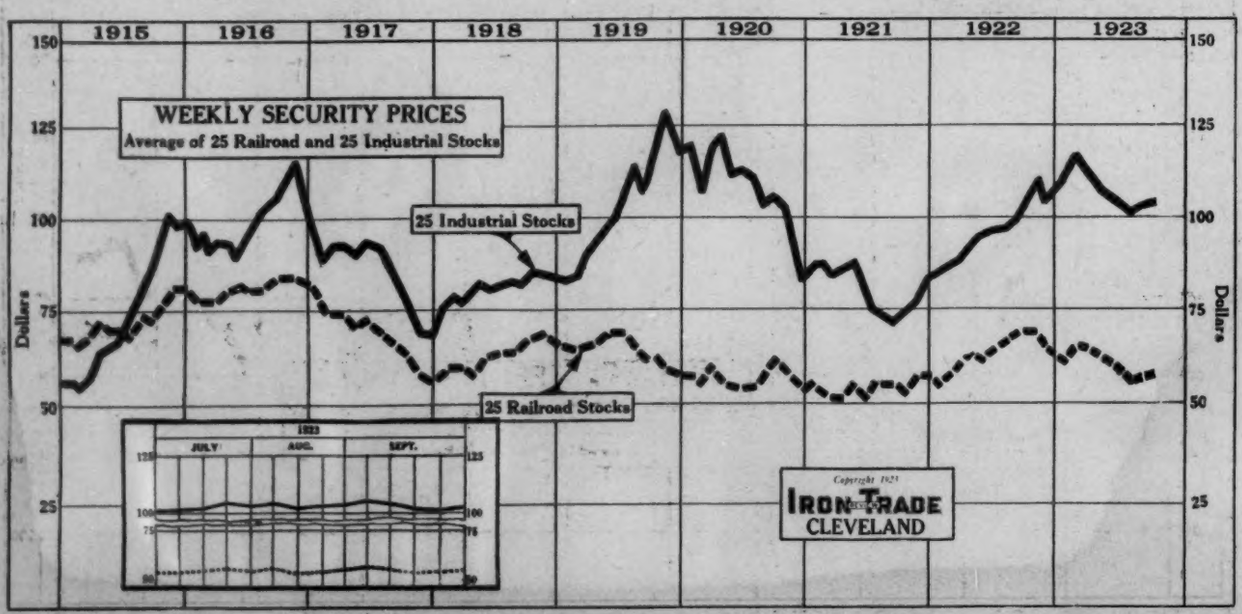
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Dollars
WEEKLY SECURITY PRICES
Average of 25 Railroad and 25 Industrial Stocks
25 Industrial Stocks
25 Railroad Stocks
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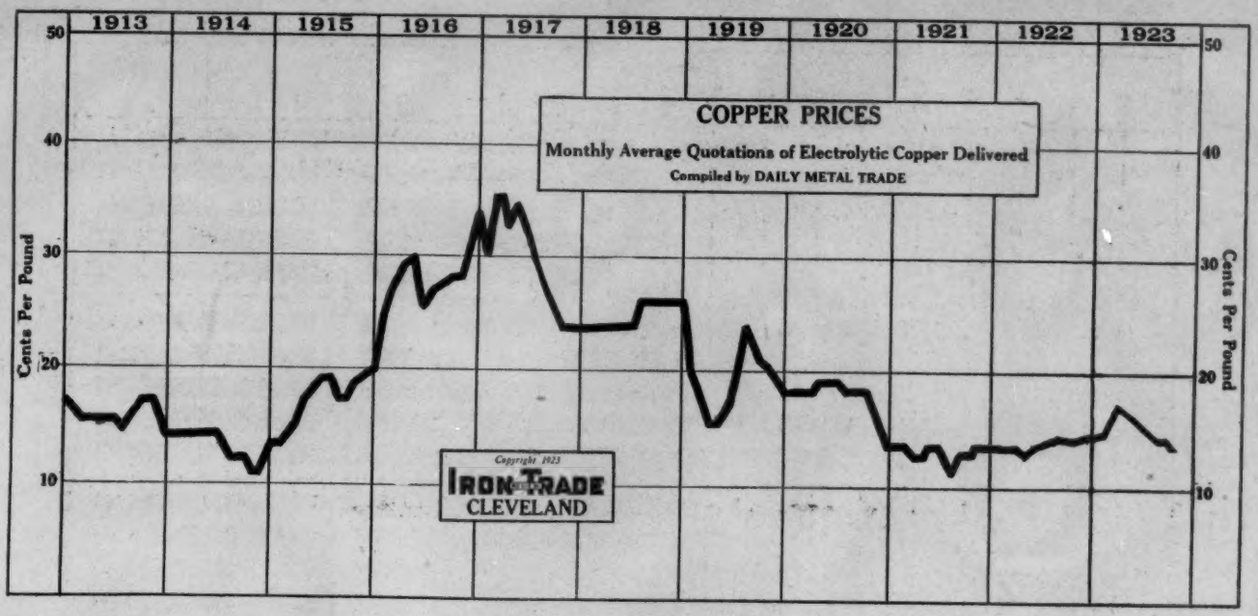
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Cents Per Pound
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Monthly Average Quotations of Electrolytic Copper Delivered
Compiled by DAILY METAL TRADE
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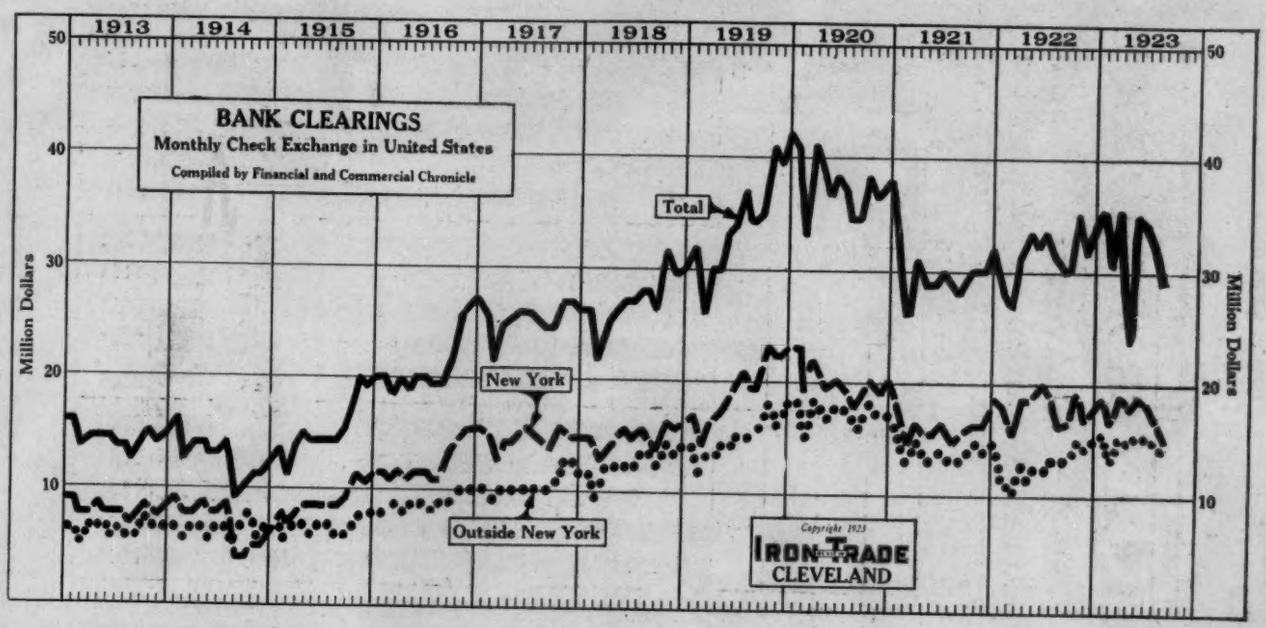
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Million Dollars
BANK CLEARINGS
Monthly Check Exchange in United States
Compiled by Financial and Commercial Chronicle
Total
New York
Outside New York
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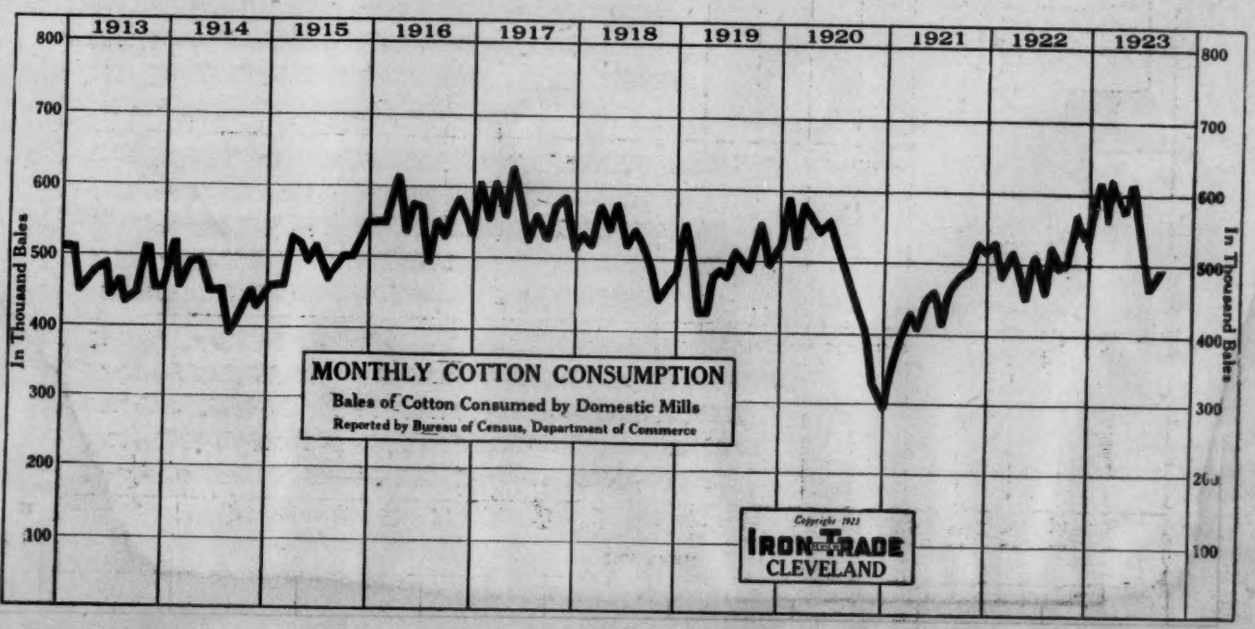
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MONTHLY COTTON CONSUMPTION
Bales of Cotton Consumed by Domestic Mills
Reported by Bureau of Census, Department of Commerce
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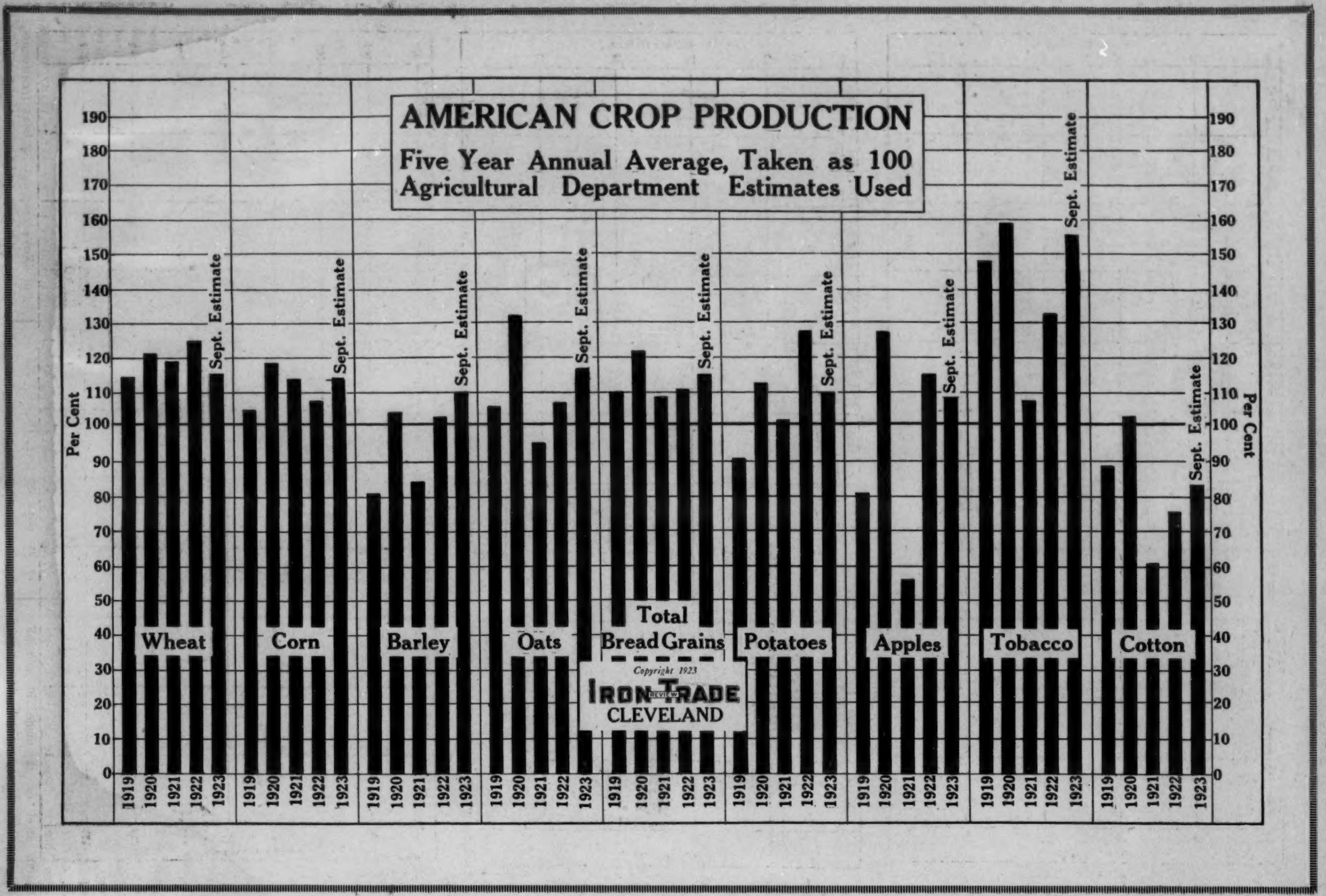
AMERICAN CROP PRODUCTION
Five Year Annual Average, Taken as 100
Agricultural Department Estimates Used
Per Cent
Per Cent
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Corn
Barley
Oats
Total Bread Grains
Potatoes
Apples
Tobacco
Cotton
Sept. Estimate
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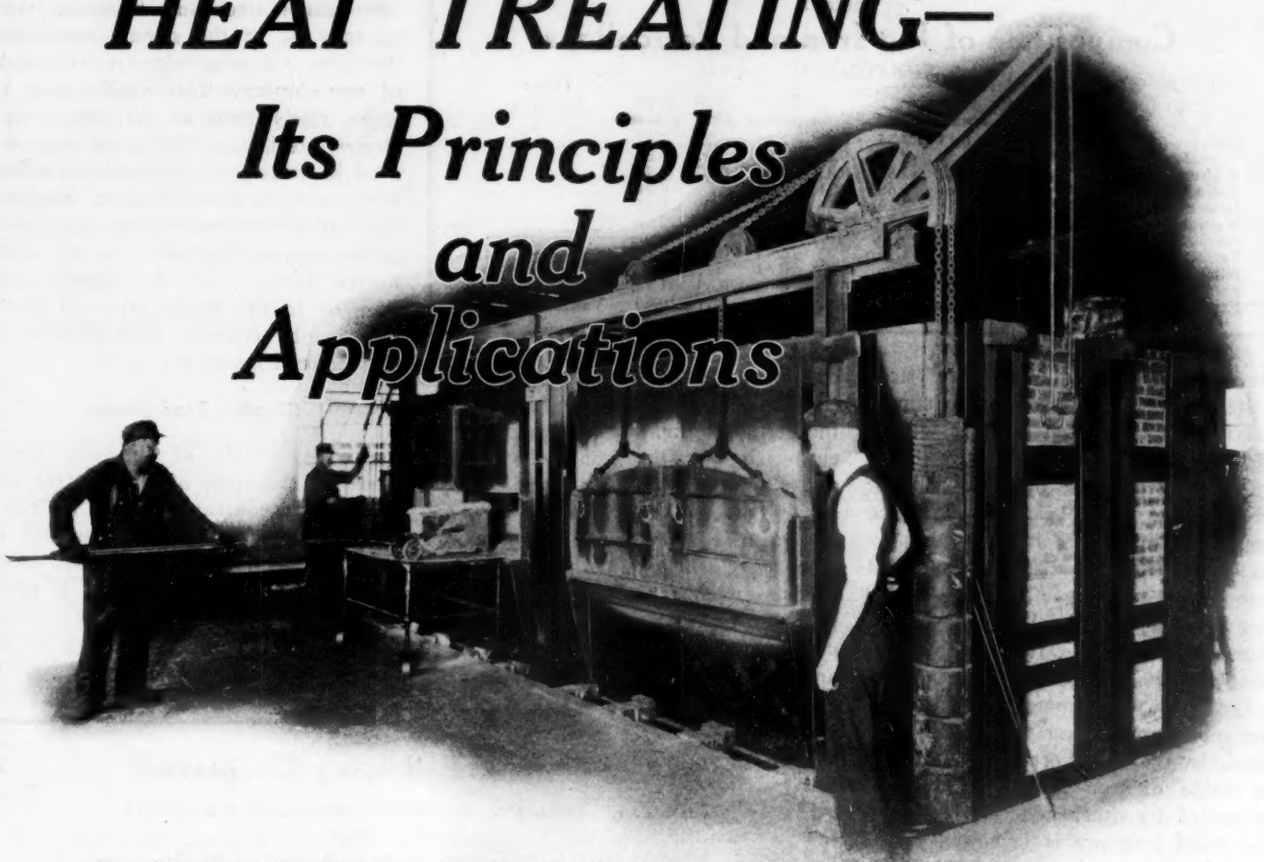
HEAT TREATING—
Its Principles and Applications



BY CHARLES H. FULTON, HUGH M. HENTON AND JAMES H. KNAPP

Chapter I—Steel and Other Commercial Iron Products

STEEL may be defined as an alloy of iron and carbon, with or without other alloying elements, containing from about 0.1 to 2 per cent carbon, which has the property of being malleable and hence forgeable within a certain range of temperature, and which can be hardened when rapidly cooled from above a certain temperature range. This definition of steel is based on physical properties, and is probably the best definition for general purposes.

Steel also may be defined according to its origin or mode of manufacture. "Molten origin steel," according to H. M. Howe in "The Metallgraphy of Iron and Steel," is an alloy of iron and carbon with or without alloying elements which while molten was cast into a mass, which is malleable at least at some one temperature. If such steel was made in a bessemer converter, it may be known as bessemer steel, if made in the electric furnace as electric steel, if made in the basic open hearth furnace as basic open-hearth steel or if made in crucibles as crucible steel. Steel as defined in the first definition of course may be made by any of these methods.

"Plastic origin steel" is steel which has never been in the molten condition but only in the pasty plastic condition. It is made by heating wrought iron in contact with carbon which causes the iron to absorb and be converted into steel. Such steel is known as blister steel and is used in the manufacture of certain kinds of cutlery, but is not of any great importance at the present day. It is to be noted that in the definition of "molten origin steel" no carbon limits are specified so that this definition will include such material as ingot iron, very low in carbon, 0.03 per cent and under, and which cannot be hardened but will exclude the alloys above 2 per cent carbon, which fall into the cast iron group, because such alloys are not initially malleable at least at some one temperature.

Heat treatment in its broadest sense is the art of applying heat to metals in such a way as closely to control the rates of heating and cooling, thereby varying the internal structure of the metal, this in turn varying the physical properties. While many metals and alloys respond to heat treatments, this series of articles is confined to

A Complete Text Book in Serial Form

ORIGINALLY written for publication in book form, the treatise of heat treating, of which the accompanying article is the first of 18 installments, will appear serially in IRON TRADE REVIEW. *As shown in the table of contents appearing on the next two pages, the chapters deal with all of the important phases of the subject.*

The work is the result of the experience of three competent authors. Charles H. Fulton is director of school of mines and metallurgy, University of Missouri; Hugh M. Henton is consulting metallurgical engineer and assistant professor of metallurgy and mining, State College of Washington, and James H. Knapp is furnace engineer, Tate-Jones & Co., Pittsburgh.

The next installment will appear in the issue of Oct. 18.

Table I

Composition of Pig Iron and Ferroalloys

	COMPOSITION								
		Carbon							Other elements
	Iron	Graphite	Combined	Total	Silicon	Phosphorus	Sulphur	Manganese	
Foundry	92.37	3.52	0.13	3.65	2.44	1.25	0.02	0.28	
Foundry	94.66	2.50	1.52	4.02	0.72	0.26	tr.	0.34	
White	94.68	...	3.83	3.83	0.41	0.04	0.02	0.98	
Basic	94.35	...	...	3.60	0.81	0.24	0.04	0.94	
Bessemer	94.78	...	...	3.50	1.14	0.09	0.03	0.46	
Malleable	94.21	...	...	3.40	1.54	0.16	0.03	0.66	
Ferromanganese	11.50	...	...	6.78	1.65	0.23	tr.	80.5	
Ferrochrome	33.43	...	...	1.21	0.29	0.03	0.02	0.09	Chromium, 64.8
Silico-spiegel	68.02	...	...	1.26	10.33	0.07	...	20.32	
Ferrotungsten	33.02	...	...	2.97	0.47	0.03	0.03	1.88	Tungsten, 61.2
Ferrovanadium	61.0	...	...	0.40	0.90	...	...	0.60	Vanadium, 36.0

the subject of the heat treatment of steel.

Steel is a member of the commercial iron series, which includes all the alloys of iron and carbon, with or without the presence of other alloying substances as noted below, and ranging from practically pure iron to an alloy of 93.3 per cent iron and 6.7 per cent carbon. The constitution and structure of this series will be graphically shown in the iron-carbon diagram in Chapter II.

The original raw material from which any commercial iron product is derived is the iron ore, consisting of an oxide of iron more or less contaminated by other mineral impurities. The chief iron ore is hematite, Fe_2O_3, the other ores being magnetite, Fe_3O_4, and limonite, $Fe_2O_3 \cdot nH_2O$. About 80 to 85 per cent of all the iron ores of the United States come from the various ranges of the Lake Superior iron districts.

Sources of Raw Materials

The iron ores are smelted at centers like Pittsburgh, Chicago, Cleveland, Youngstown, Bethlehem, Buffalo, etc., in blast furnaces into pig iron of various grades. This pig iron may be used as such in the manufacture of castings or be converted by the different steelmaking processes into many different kinds and forms of steel. The pig iron produced in the blast furnace is an impure product and in general consists of an alloy of iron and carbon and silicon, with smaller quantities of manganese, sulphur and phosphorus. The sulphur and phosphorus are undesirable constituents and the amount permissible in iron is strictly limited. Sulphur for steelmaking irons should always be less than 0.05 per cent and phosphorus may have to be low in iron for the bessemer process and acid open-hearth process, but may be up to 1 per cent and even more in iron for the basic open-hearth process, since this process removes phosphorus in making steel. The composition of typical cast irons is shown in Table I.

Foundry irons are remelted in the cupola and made into castings. The carbon must be largely present in the form of graphite and not as cementite so that the iron will be soft and fit for machining. Iron containing its carbon largely in the form of cementite is called white cast iron, the amount of silicon in the iron determining whether the carbon forms graphite or cementite. Basic iron is used in making basic open-hearth steel and bessemer iron in making bessemer steel. Basic open-hearth steel, acid open-hearth steel and bessemer steel all may be of the same composition, the term referring only to the mode of manufacture. This applies also to other steels such as crucible steel, electric steel, etc. The alloy irons are used in making alloy or special steels, such as manganese, chrome, tungsten and vanadium steels. They are added to the molten steel bath in the open-hearth furnace, or the electric furnace or to the molten steel in crucibles in the crucible steel process, in the required quantity.

Classify Iron Series

A classification of the iron series based on the mode of manufacture and the carbon content is given in Table IV. The only important member of the first group or slag-bearing metal series is wrought iron, which is made from cast iron by the puddling process. Wrought iron is used as such in the form of bars for various purposes, is

Contents of Following Chapters

CHAP. I. STEEL AND OTHER COMMERCIAL IRON PRODUCTS
(In this issue)

CHAP. II. THE STRUCTURE OF IRON AND STEEL
The Structure of Pure Metals—Object of Heat Treatment—Structure of Alloys—Effect of Mechanical Work on Grain Size—Amorphous Metal—Annealing—Control of Grain Size—Structure of the Iron-Carbon Alloys—Critical Points—Cooling Curve of Pure Iron—Critical Points Influenced by Foreign Substances—Iron-Carbon Diagram—Cementite—Austenite—The Eutectic—Hardenite—Ferrite—Pearlite—Recalescence Point—Constitution of Solid Cast Iron—Graphite in Cast Iron—Constitution of Steel—Composition of Pearlite—Network Structure of Annealed Steel—Hypo and Hyper-Eutectoid Steels—Physical Properties Related to Constitution—Hardening by Quenching—Martensite—Troostite—Sorbite—Heat Treatment as Influenced by Rate of Cooling—Spheroidizing of Cementite—Tempering

CHAP. III. RELATION OF STRUCTURE TO PHYSICAL PROPERTIES
Physical Properties—Stress-Strain Diagram—Grain Structure and Physical Properties—Control of Grain Size in an Eutectoid Steel—Grain Size Diagram of Eutectoid Steel—Control of Grain Size in a Hypo-Eutectoid Steel—Grain Size Diagram for Hypo-Eutectoid Steel—Normalizing—Control of Grain Size in Hyper-Eutectoid Steel—Control of Grain Size in Ingot Iron—Grain Size Diagram for Very Low Carbon Metal—Size of Grains—Grain Size of Iron as Affected by Temperature—Grain Size and Mechanical Work—Finishing Temperature Diagram—Minimum Grain Size and Physical Properties—Influence of Temperature From Which Steel is Cooled upon its Physical Properties—Strength of the Constituents of Steel—Physical Properties Related to Structure—Microstructural Composition of Pearlitic Steels—Influence of Quenching Temperature on the Physical Properties of Steel—Influence of the Rapidity of Quenching Brinell Hardness—Scleroscope Hardness—Comparison of Brinell and Scleroscope Hardness Numbers—Diagram Showing Relation Between Hardness and Physical Properties—The Effect on the Physical Properties by the Addition of Special Alloying Elements—The Effect of Nickel—Effect of Manganese—Effect of Vanadium—Effect of Chromium—Effect of Tungsten and Molybdenum—Effect of Silicon

CHAP. IV. HEAT TREATMENT IN GENERAL
Selection of the Proper Steels—Definition of Heat Treatment—Annealing and Normalizing—Grain Refining—Normalizing—Hardening and Tempering—Changes in Volume During Hardening—Quenching Media—Heating Baths—Tempering or Drawing—Carburizing and Case Hardening—The Case—Pot Hardening, Pack Hardening—Control of Temperature and Furnaces

CHAP. V. NORMALIZING AND ANNEALING
Material Treated—Factors Influencing Normalizing and Annealing—Structure Obtained—Annealed Structure—The Effect of High Carbon

manufactured into pipe, and is the raw material used for making crucible steel. The second or slagless metal series is the important group. It is divided into two subgroups, namely, the normal or carbon group, which contains the ordinary carbon steels of different carbon content and the ordinary cast irons, and the alloy group which contains the alloy steels and the alloy irons used in making these steels.

Based on Carbon Content

The vertical subdivisions are based on carbon content. The first is low carbon (up to 0.3 per cent) which includes ingot iron of practically no carbon content, with properties in general similar to wrought iron and used for purposes where corrosion is a deciding factor; low-carbon steel, or extra soft, or dead soft steel, containing from 0.08 to 0.18 per cent carbon, and used for parts that must be welded, as pipe, chain, rivets and pressing and stamping purposes; structural steel, soft medium, containing from 0.15 to 0.25 per cent carbon, and used for structural plates, shapes, bars, for bridges, buildings, cars, locomotives, boiler steel, drop forgings and bolts; and medium carbon steel, containing from 0.20 to 0.35 per cent carbon and used for structural ship steel, shafting, automobile parts and drop forgings.

The second group includes steel containing moderate amounts of carbon (0.3 to 2.0 per cent) comprising medium hard steels with carbon contents of from 0.35 to 0.60 per cent and used for large locomotive forgings, car axles, rails, etc.; hard steel with carbon from 0.60 to 0.85 per cent and used for wrought steel wheels for steam and electric railway service, locomotive tires, rails, tools, such as sledges, hammers, pick points and crow bars; spring steel with carbon from 0.85 to 1.05 per cent and used for automobile and other vehicle springs, tools, such as hot and cold chisels, rock drills and shear blades; and spring steel with carbon from 0.90 to 1.15 per cent and used for railway springs and general machine shop tools. In the group having a moderate amount of carbon also are included the alloy steels which will again be mentioned. The third group covers steel containing much carbon (2 to 6 per cent) comprising the cast irons and alloy irons already referred to as regards composition and use, and malleable iron, which is the raw material for malleable castings. The classification given in the three foregoing paragraphs is according to that of Tiemann in *Iron and Steel.*

Application of Heat Treating To Carbon and Alloy Steels

Heat treatment is employed largely with the carbon steels from medium up, and the special alloy steels. As again pointed out in subsequent chapters, in order to get results from heat treatment it is primarily necessary to use a steel of the proper composition for the purpose intended. For example, in mak-

Table II

Composition of Spring Steels

Kind of spring	Composition: Carbon	Manganese	Silicon	Chromium	Vanadium	Sulphur	Phosphorus
Railway	0.90-1.15	0.5	..	..	...	0.05	0.05
Railway	0.90-1.15	0.5	0.5	..	...	0.05	0.05
Vehicle	0.85-1.05	0.5	..	..	...	0.05	0.05
Automobile and railway	0.45-0.55	0.7	1.8	..	...	0.045	0.045
Automobile and railway	0.45-0.65	0.8	..	1.0	0.15	0.05	0.04

Table III

Composition of Miscellaneous Steels

Object	Composition: Carbon	Manganese	Silicon	Nickel	Sulphur	Phosphorus
Basic open-hearth rails	0.5 -0.75	0.6 -0.9	0.2	...	0.04	0.04
Bessemer rails	0.37-0.55	0.8 -1.10	0.2	...	0.04	0.10
Manganese steel rails	1.0 -1.35	10-15	..	...	0.05	0.10
Structural bridge steel	0.16-0.26	....	..	...	0.05	0.05
Structural nickel steel	0.45	0.7	..	3.25	0.05	0.05
Locomotive driving axle	0.60	0.4 -0.8	..	...	0.04	0.04
Steel boiler tubes	0.08-0.18	0.3 -0.6	..	...	0.045	0.04
Rivet steel	.....	....	..	...	...	...

Series on Heat Treating Is Complete

(Concluded from Preceding Page)

Content on Structure—Treatment of Forgings—Effect of Cold Work—Treatment of Tool Stock—Treatment of Hardened Steel—Double Treatment Described—Spheroidizing of Cementite—Effect of Normalizing and Annealing on Physical Properties—Normalizing Effect—Annealing Effect—Effect on Tensile Strength—Effect on Hardness—Effect on Ductility—Effect on Toughness—Effect on Other Properties—Sheet Metal Properties—Influence of Size on Normalizing and Annealing Process—Cooling for Annealing—Cooling for Normalizing—Design for Furnaces—Design of Small Furnaces—Design of Large Furnaces—Dimensions of Large Furnaces—Mode of Operation of Furnaces—Temperature Control of Furnaces—Fuel Used and Furnace Lining—Oil Fuel—Furnace Atmosphere for Annealing—Oil Burners

CHAP. VI. HARDENING AND TEMPERING

Material Suitable for This Work—Partial Hardening—Iron-Carbon Diagram—Method of Use of the Diagram—Furnaces and Pyrometers for Hardening—Forge Heating and Tool Dressing—Quenching Baths and Quenching Media—Lead Baths—Water Quenching—Oil Quenching—Solution Quenching—Compressed Air Cooling—Tempering Furnaces and Baths—Tempering in Liquid Salts and Alloys—Typical Operation of Hardening—The Influence of the Critical Temperature—Structure of Hardened Steel—Martensite—Modified Quenching—Effect of Shape on Hardening—Obtaining of Uniform Structure—Procedure in Tempering—Temper Colors—Double Treatment—Mechanical Properties of Tempered Steel—Effect of Tempering upon Physical Properties—Hardening and Tempering Tool Steel—Table of Hardening and Tempering

CHAP. VII. CARBURIZING AND CASE HARDENING

Terms Defined—Material Suitable for Carburizing—Uniform Material Important—Properties Desired From the Carburizing Process—Different Degrees of Casing Desired—Constituents Obtained by Case Hardening—Metallographic Constituents of Iron and Steel—Quenching for a Martensite Case—Martensites of Core and Case—Various Cores Desired—Hardness of Different Martensites—Carburizing Agents and Processes—Solid Cements—Fast Cementation and Enfoliation—Depth of Case and Temperature—Carburizing Boxes and Packing—Liquid Cements—Gaseous Cements—Comparison of Cements—Shimer Process—Treatment of Bolts—Ball Races and Bushings—Carburizing Alloy Steels—Selection of Carbon and Alloy Steels—Spark Test—Furnaces for Carburizing

CHAP. VIII. THE HEAT TREATMENT OF ALLOY STEELS

General Consideration—Constitutional Diagram of Alloy Steels—Heat Treatment of Nickel Steels—Heat Treatment of Chromium Steels—Heat Treatment of Nickel Chromium Steels—Heat Treatment of Vanadium and Chrome-Vanadium Steels—Heat Treatment of Manganese and Silicon Steels—Heat Treatment of High-Speed Tool Steels

ing automobile springs there will be a choice of a suitable plain carbon steel or an alloy steel. If the plain carbon steel is used owing to its lower cost, it would be useless to pick a medium carbon steel, for no method or amount of heat treatment on this steel would turn out a good spring; but if a spring steel of 1 per cent carbon is chosen, excellent springs can be made by proper treatment.

The so-called automobile steels, in addition to being employed in automotive work, are used widely in many branches of industry. Automobile steels, which might well be called "general purpose" steels are divided into six groups, distinguished by the alloying element:

1. Automobile carbon steels.
2. Automobile nickel steels.
3. Automobile nickel-chromium steels.
4. Automobile chromium steels.
5. Automobile chromium-vanadium steels.
6. Automobile silico-manganese steels.

Five standard steels comprise the automobile nickel steel group. Their specified analyses are as follows:

	Carbon per cent	Nickel per cent	Manganese per cent
1	0.15	3.5	0.65
2	0.20	3.5	0.65
3	0.30	3.5	0.65
4	0.35	3.5	0.65
5	0.40	3.5	0.65

Phosphorus not over 0.04 per cent and sulphur not over 0.05 per cent.

Automobile nickel-chromium steels are subdivided into four groups according to the percentage of nickel and chromium contained. The classification is as follows:

Group No. 1

	Carbon per cent	Manganese per cent	Nickel per cent	Chromium per cent
1	0.20	0.65	1.25	0.60
2	0.25	0.65	1.25	0.60
3	0.30	0.65	1.25	0.60
4	0.35	0.65	1.25	0.60
5	0.40	0.65	1.25	0.60

Phosphorus not over 0.04 per cent and sulphur not over 0.045 per cent.

Group No. 2

	Carbon per cent	Manganese per cent	Nickel per cent	Chromium per cent
1	0.20	0.45	1.75	1.10
2	0.30	0.45	1.75	1.10
3	0.40	0.45	1.75	1.10
4	0.50	0.45	1.75	1.10

Phosphorus not over 0.04 per cent and sulphur not over 0.04 per cent.

Group No. 3

	Carbon per cent	Manganese per cent	Nickel per cent	Chromium per cent
1	0.15	0.60	3.00	0.80
2	0.35	0.60	3.00	0.80
3	0.50	0.60	3.00	0.80

Phosphorus not over 0.04 per cent and sulphur not over 0.04 per cent.

Group No. 4

	Carbon per cent	Manganese per cent	Nickel per cent	Chromium per cent
1	0.20	0.45	3.50	1.50
2	0.30	0.45	3.50	1.50
3	0.40	0.45	3.50	1.50

Phosphorus not over 0.04 per cent and sulphur not over 0.04 per cent.

The automobile carbon steels are six in number and contain carbon, manganese, sulphur and phosphorus in the following percentages:

	Carbon Per cent	Manganese per cent
1	0.10	0.45
2	0.20	0.45
3	0.25	0.65
4	0.35	0.65
5	0.45	0.65
6	0.95	0.35

Phosphorus is limited to 0.045 per cent and sulphur to 0.05 per cent in these six steels.

Seven standard steels comprise the group of automobile chromium steels, with distinguishing analyses as follows:

	Carbon per cent	Chromium per cent	Manganese per cent
1	0.20	0.75	0.35
2	0.40	0.75	0.35
3	0.65	0.75	0.35
4	0.95	1.00	0.35
5	1.20	1.00	0.35
6	0.95	1.20	0.35
7	1.20	1.20	0.35

Phosphorus not over 0.03 per cent and sulphur not over 0.04 per cent.

There are two standard automobile silico-manganese steels, their analyses following.

	No. 1	No. 2
Carbon	0.50	0.60
Manganese	0.70	0.60
Silicon	1.95	1.65
Phosphorus	0.045	0.045
Sulphur	0.045	0.045

The automobile chromium vanadium steels are eight in number. The

(*Concluded on Page* 950)

Table IV

General Classification of Iron and Steel

Based on Carbon Content and Method of Manufacture (H. M. Howe)

		With Very Little Carbon 0 to 0.3 Per Cent		With a Moderate Amount of Carbon 0.3 to 2.0 Per Cent	With Much Carbon 2 to 4.5 to 6 Per Cent
Slag Bearing or Weld Metal Series	Wrought Iron	Puddled Iron	Weld Steel	Blister Steel	
		Bloomery or Charcoal Iron		Puddled Steel	
				Malleable Cast Iron	
Slagless or Ingot Metal Series	Normal or Carbon Group	Soft Steel or Ingot Iron: Made by the bessemer, open-hearth, crucible, or electric process	Half Hard or Medium and High or Hard Carbon Steel: Made by the bessemer open-hearth crucible or electric process	Normal or Carbon Cast Iron	White Iron, Mottled Iron, Gray Iron, Silvery Iron
	Alloy Group		Alloy Steels	Alloy Cast Irons	Ferro Tungsten, Ferro Manganese, Silico Spiegel, Ferro Silicon, Ferro Chrome, Ferro Vanadium

Alloy Steels: Nickel Steel; Manganese Steel; Chrome Steel; Nickel-Chrome Steel; Chrome-Vanad. Steel; Vanadium Steel; Silicon Steel; Molybdenum Steel; Tungsten Steel

HEAT TREATING HAS KEPT PACE WITH THE GROWTH OF THE AUTOMOTIVE INDUSTRY

War Aided Art of Heat Treating

Developed to Man's Estate by Influence of Automobile Industry, Heat Treating Was Put To Test by Severe Requirements of World Conflict—History Shows Real Progress in Twentieth Century

HEAT treating is so widely employed in modern engineering and has assumed its present commanding position through such rapid development that it is difficult to believe that the art is nearly as old as that of making iron itself. Although the methods of heat treating now practiced reflect the experience and refining influence of many investigators whose most valuable work was performed in the last few decades, a knowledge of hardening processes existed as far back as a thousand years before the first century.

Those who are wont to consider heat treating as a modern achievement will find interest and enlightenment in the published works of a few of the world's earliest writers. The following lines from Homer's Odyssey, written about 950 B. C., while flavored with evidence of the barbaric instinct, surely ring true in their description of the quenching of hot metal:

And so when armourers temper in the ford
The keen-edged pole-axe or the shining sword,
The red-hot metal hisses in the lake:
Thus in his eyeball hissed the plunging stake.

Five hundred years later, Sophocles, a Greek poet, spoke of tempering iron in water, while in the first century Pliny, the elder, in his extensive works of more than a hundred volumes, refers to the treatment of steel. That quenching in other mediums than water was known by the Romans at that time is shown by Pliny's statement that "the goodness of the steel ariseth from the goodness of the iron mine from which it comes with the assistance of waters and various quenchings of it in waters and oyls."

Although a chisel with a case hardened point has been found which is said to date back to 500 B. C., the first general use of the case hardening process seems to have been in connection with file making. Brearley, in his book "The Case Hardening of Steel," states that Theophilus Presbyter, a Benedictine monk, wrote a book with instructions for case hardening files. Files were wrapped in dried skins, heated slowly to full redness and then quenched, the charred leather acting as the hardening medium. This method apparently was introduced prior to the ninth century. The Chinese are credited with having a knowledge of case hardening as early as the eighth century.

Following the ninth century, interest in hardening lagged for about 900 years, due to the fact little development was made in the study of the structure of iron. However, in the period from 1722 to 1800 Reaumier, Huntsman, Cort and Mushet contributed valuable data to the knowledge of the making and working of iron and steel, which served as the basis for the accelerated progress in heat treating recorded in the nineteenth century. Among the first published papers on alloy steels was that of Faraday and Stodart, which appeared in 1820.

Steelmaking received a great impetus from the development of 1856. In that year Bessemer first described his pneumatic process, David Mushet was allowed a patent for using manganese with steel, the Siemens brothers developed a gas producer and patented their regenerative furnace, and Vickers introduced the manufacture of steel castings.

In the next year Robert Mushet invented air hardening steel and was granted several patents on tungsten steel. From this date the tendency to depend more heavily on alloys with steel was marked. Hadfield's work with manganese resulted in his obtaining important patents in 1884, and in 1889 the merits of nickel steel were announced by James Riley.

In the meantime, metallurgists were devoting a great amount of attention to the study of the structure of iron and steel. In 1888 Professor Howe

suggested names for the various associations of iron and carbon. Two years later Osmond read a paper discussing the critical points of steel, and in 1891 Sir W. Robert-Austens published an important treatise on metallurgy.

The work of these and other metallurgists on the critical points of steel and in clearing up the iron-carbon diagram really constituted the groundwork for the new era of heat treating that began just before the dawn of the twentieth century.

In the decade from 1890 to 1900, so many factors bearing on heat treating were in the process of development that, viewed from the present perspective, it is not surprising that the art progressed with leaps and bounds in the early years of the new century. The bicycle fad, which was at its height in the early nineties, lent impetus to case hardening and other forms of heat treating. As ball bearings superseded friction bearings, an opportunity arose for placing case hardening upon a production basis. In the meantime, the basic patents for the manufacture of automobiles were granted to G. B. Selden, thus paving the way for a new industry which less than a score of years later was to revolutionize heat treating practice.

Develops High-Speed Tool Steel

Still another favorable factor was taking form in the guise of important investigations on the cutting efficiency of tools, undertaken by Taylor and White at the plant of the Bethlehem Steel Co. When in 1900, the results of this work were shown at the great Paris exposition, industrial leaders from all over the world marvelled. The high-speed steel exhibited was far superior to anything hitherto known, and quickly came into general use.

However, the Taylor and White exhibits were not the only ones at Paris claiming the attention of heat treaters. The now well-known Brinell method of testing the hardness of steel was demonstrated, and a Swedish company displayed 13 steels which had been subjected to 30 different heat treatments, and explained the best temperatures for hardening the 13 steels.

In spite of the impetus given heat treating by these influences, manufacturers were slow to adopt new methods. The art still was in the experimental stage, and real progress was held back until the vast fund of recently accumulated data could be interpreted in terms of practical routine. Even as late as 1909, a writer in a technical paper dealing with machine tools stated that there were few efficient heat treating plants in the country. He pointed to the heat treating department of Worcester Polytechnic institute, Worcester, Mass., and the shop of Wheelock Lovejoy & Co. in the basement of a New York store as the best examples of modern heat treating plants existing at that time.

In 1914, the rapid growth of the automobile industry had elevated the practice of heat treating to a place of commanding importance. Crankshafts, connecting rods, and many other moving parts of motors were being manufactured by the tens of thousands and required heat treating of exacting accuracy and uniformity. The greatly increased use of ball bearings also had placed case hardening on a status of mass production. As a result of this growth, heat treating equipment underwent a remarkable change. Improved refractories were developed, better combustion of fuels was obtained and a more accurate control of heat was made possible through a more general use of pyrometers and recording instruments.

War Aids Steel Treating

Judging from the burden placed on all manufacturers in 1917, 1918 and 1919 by the needs of the forces of the United States and her allies in the world war, it is fortunate that the automobile industry had established heat treating on a firm foundation prior to the beginning of hostilities. Had this country been obliged to take its heat treating facilities as they were in 1900, instead of as they existed in 1916 by virtue of the automobile industry, the contributions of the United States to the European conflict would have been seriously, if not disastrously, reduced. One can easily imagine what might have happened had it been necessary to develop and construct the Liberty r[illegible] mounts, aircraft, submarine chasers, transports, artillery, shells, etc. with the aid of the faulty knowledge and experience of heat treating possessed in 1900.

However, the war, far from draining the resources of heat treating, nourished it and inspired it. The government specifications were severe, and in order for manufacturers to execute contracts with the minimum of rejections, they obtained or developed improved equipment. There is no question but what much of the increased efficiency in heating furnace practice attained during the past few years can be traced back to the drastic influence of government specifications in 1918.

The war left the United States with a full-fledged heat treating industry, which in common with all other branches of manufacturing suffered in 1920 and 1921 from the effects of the business depression. Thanks, however, to the remarkable comeback of the demand for automobiles, the facilities for heat treating have been largely engaged during the past year.

It is not easy to outline the present scope of heat treating. Its appli-

High Spots in Rise of Heat Treating

INASMUCH as no connected account of the development of heat treating has appeared, it is difficult to obtain a true perspective from the disjointed material contained in the various books treating the subject. The following events having a bearing on the growth of heat treating have been listed as a result of a thorough study of practically all of the books on iron and steel manufacture, metallurgy and heat treatment published since 1900. THE CHRONOLOGY OF IRON AND STEEL, *by Stephen L. Goodale, has been consulted freely in compiling this brief list.*

962 B. C.—Homer in "Odyssey" mentions tempering of swords in water.

500 B. C.—A chisel, which is in museum at Colombo, Ceylon, when examined microscopically proved to have a case hardened point.

450 B. C.—Sophocles, Greek poet, mentions tempering of iron in water.

60 A. D.—Pliny, the elder, writes of various quenchings of iron in "waters and oyls."

700—Case hardening is said to have been used by the Chinese in the eighth century.

890—Theophilus, a Benedictine monk, gave instructions for case hardening files.

1722—Reaumur published researches on conversion of bar iron into steel and annealing of hard iron castings.

1731—Peter van Musschenbroek constructs a pyrometer.

1737—At Strassburg, Alsace, instructions for hardening steel by quenching are published anonymously.

1740—Huntsman conducted experiments to secure a better grade of steel for springs.

1820—Faraday and Stodart published paper on alloys for better cutting tools.

1857—Mushet introduced air hardening steel involving the use of tungsten.

1860—The first American tool steel of high quality was made by Hussey Wells & Co.

1884—Hadfield took out patents on manganese steel.

1886—Le Chetelier published researches on pyrometry and secured automatic record of high temperature.

1888—Howe suggested the names "cementite," "pearlite" and "ferrite."

1889—Merits of nickel steel were announced by James Riley in Great Britain.

1890—Osmond read a paper on the critical points of steel.

1891—Sir W. Robert-Austen published his introduction to metallurgy.

1892—Popularity of bicycle lends impetus to case hardening.

1895—The Selden patent on automobiles was allowed, marking the beginning of the American automobile industry.

1895—Charpy investigated the hardening of steel.

1900—Taylor and White exhibited high speed tool steel at the Paris exposition.

1900—A report of most significance iron and steel exhibited at Paris exposition H. M. Howe mentions the Brinell tests for the hardness of steel, the influence of 30 heat treatments on 13 steels and the best temperatures for hardening 13 steels.

1907—Vanadium steel was made in an open-hearth furnace on a commercial scale at Canton, O.

1913—Heat treatment of high pressure cylinders was introduced, thereby reducing the weight about 25 per cent.

1914—Heat treating assumes important place in automotive industry.

1918—Liberty motor, tractors, gun forgings, submarine chasers, airplanes, artillery and other war needs engage heat treating skill and facilities.

cations find full play in the automotive branches of industry because there are few important metal parts of automobiles, tractors or airplanes that do not undergo some form of heat treating. However, the thermal treatment of steel extends far beyond the confines of this single industry. The railroads, notoriously wedded to the use of carbon steels only a few years ago, are employing an increasing tonnage of alloy steel. To such items as axles, crank arms, etc., which have been heat treated for many years, now may be added many steel castings, bolts and studs, link motion details, etc.—all of which receive heat treatment. Track bolts, rail splices and other track details are heat treated by some roads.

The annealing of castings is not new, many foundrymen having adopted this method of relieving shrinkage strains many years ago. However, a few steel foundry operators advocate air quenching as well as oil and water quenching and tempering. Producers of gray iron castings have found that heating the metal to 550 degrees and allowing it to cool slowly is equivalent to the practice of "aging," which requires a period of several months.

In the malleable cast iron industry, the annealing process takes the form of pure heat treating because the principal characteristics of the product depend entirely upon the annealing. No important changes in method have been adopted in recent years, but investigations on the subject have cleared away many of the misunderstandings regarding annealing so that methods have been standardized and the routine of the process elevated to basis of reliability.

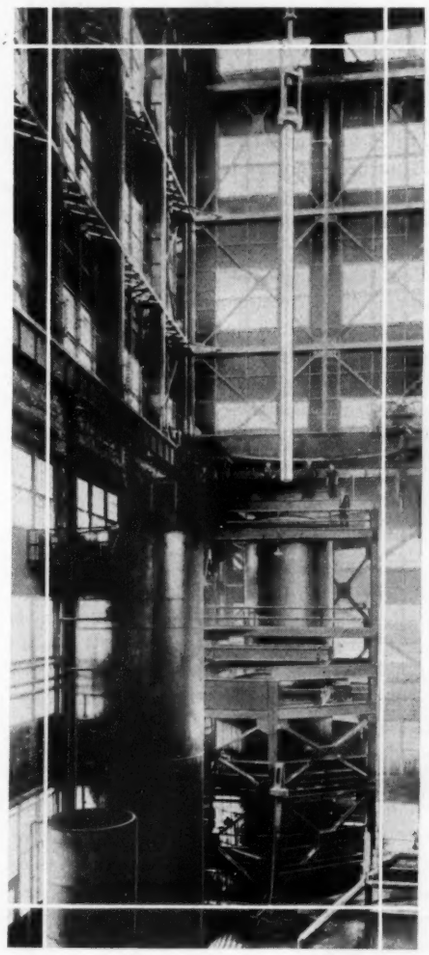
Heat Treat Rolled Steel

Perhaps the greatest increase in the use of modern heat treating methods has been in connection with rolled steel. When it is realized that less than a score of years ago thermal treatment was confined to tool steel and a relatively few machinery details, the marked spread of the process into the field of commercial steels is significant.

This development is closely allied to the growth in the production and use of alloy steels for commercial use. Whereas less than 200,000 tons of alloy steel ingots and castings were produced in 1909, more than 1,500,000 tons were produced each year in 1917, 1918, 1920 and 1922. According to the American Iron and Steel institute, there were 138 plants engaged in making alloy steel ingots or castings in the United States in 1922. The following figures, compiled by the institute, show the production of alloy steel in gross tons:

Year	Ingots	Castings	Total
1909	158,978	23,002	181,980
1910	538,462	29,357	567,819
1912	689,392	103,109	792,501
1914	577,107	69,846	646,953
1916	1,306,157	56,458	1,362,615
1918	1,721,367	66,485	1,787,852
1920	1,591,939	68,353	1,660,292
1922	1,614,392	59,104	1,673,496

Nickel, chromium, chrome-nickel, chrome-vanadium and manganese steels comprise most of the tonnage of alloy steel ingots produced. Some of this steel is used in its finished state without treatment, but the greater part, particularly chromium steel, requires heat treatment.



HEAT TREATING EQUIPMENT IMPROVED UNDER INFLUENCE OF WARTIME REQUIREMENTS

An idea of the widespread use of these alloy steels may be gained from a brief outline of their applications. Chrome-vanadium steels are used largely for locomotive work, including driving axles and other forgings, and springs and axles for automobiles; chrome-nickel steels are employed for shafts, projectiles, armor and many automobile parts; chrome steels are used for safes, rolls, small tools, including hammers, hatchets, etc., and for chains, track bolts, balls and rings for bearings, and certain dies; and nickel steels are used for machinery forgings, resistance units, gun forgings, structural members of buildings and bridges, and automotive details.

Progress in the shaping of metals has had an important bearing on heat treating. Many pressed and drawn products are particularly adapted to thermal treatment whereas the same articles, if previously produced as castings or drop forgings probably did not undergo such treatment. Welding offers a new field in which heat treating doubtless will play an increasing important role. Recent research work has convinced investigators that too little attention has been paid to the residual stresses in welded joints created by expansion and contraction during the welding operation. As a result, well regulated annealing, or even more extensive heat treating, is being employed to dissipate these strains.

The future development of heat treating doubtless lies in the more extensive use of treated commercial alloy steels. The fact that the full possibilities of a steel product cannot be utilized unless it is heat treated is not in accord with the present-day desire for economy. Therefore, it may be expected that the increasing demand for members having greater strength and less weight, or a greater degree of ductility, hardners, toughness or other property enhanced by thermal treatment, will help elevate the art of heat treating to an even more important position.

Advisory Board To Aid in Research Work

One of the developments of the past year at Carnegie Institute of Technology, Pittsburgh, according to an announcement from the institution has been the organization of an advisory board of Pittsburgh business and scientific men to co-operate with the work of the department of mining and metallurgy. The formation of the board and the enlisting of the co-operation of its members, constitute another step in line with the policy of the institute to link up its educational facilities with outside industry.

The immediate function of the advisory board, according to the announcement, will be to co-operate with the school in the solution of current problems affecting the work of the mining and metallurgy department. A similar board already has been organized during the past two years in co-operation with the co-operative de-

partment of mining. Beginning with the next college year special courses for graduates of liberal arts and technical colleges will be given by the department of mining of metallurgy. This decision has been made, it is said, in response to a definite and increasing demand of the metallurgical and allied industries for trained college men.

The purpose of the courses, some of which may be completed within one college year, will be to train young men for positions in the metallurgical and allied industries leading to positions in managerial, sales and executive capacities. A consistent demand, it is pointed out, is being made in this and other iron and steel producing districts, for college men, particularly in some of the nontechnical capacities.

The iron and steel industry with a capital investment of more than five billions of dollars, and with more than a million and a half workers employed, has long been known to be a sufferer of the lack of trained college men. The co-operation of the newly organized advisory board already has been provided in preparing the curricula for the new courses. The membership of the board includes many prominent executives of the steel industry.

Continues Investigation on Fatigue Limits

An investigation is being carried out by the bureau of standards, Washington, on the fatigue properties of various woods and metals. In connection with this work 26 specimens of 3½ per cent nickel steel have been tested in the rotating beam fatigue machine by the load deflection method. The results are consistent for the different heat treatments to which the metal has been subjected.

Fatigue values of from 50 to 55 per cent of the ultimate strength were obtained when the proportional limit was above that of the fatigue limit. When the proportional limit of the material was less than 50 per cent of the ultimate strength, the fatigue limit was less than the proportional limit.

Fatigue tests by the load deflection method also have been made in a rotary beam fatigue machine on three specimens cut from a thermit-welded rail joint. The fatigue limit averaged 31,500 pounds per square inch with an average ultimate strength of 57,445 pounds per square inch. The average percentage of the fatigue limit to the ultimate strength was 54.9.

Heat Treating—Principles and Applications

(*Concluded from Page* 946)

chromium and vanadium content is the same for all steels, while the carbon and manganese varies as follows:

	Carbon per cent	Manganese per cent
1	0.20	0.65
2	0.25	0.65
3	0.30	0.65
4	0.35	0.65
5	0.40	0.65
6	0.45	0.65
7	0.50	0.65
8	0.95	0.35

Each of the eight steels contains 0.95 per cent chromium and 0.18 per cent vanadium. Phosphorus not over 0.04 per cent, and sulphur not over 0.04 per cent.

Steel for a great variety of forgings for all purposes comes in billets, blooms and slabs, the rough shapes from which the forgings are made. There are both carbon steels and alloy steels, similar to those described under the automobile steels. The carbon content varies from as low as 0.05 to not over 0.60 per cent in the 17 different standard grades. The manganese ranges from 0.3 to 0.8 per cent. In the alloy steels the nickel, chromium and vanadium content are similar to those in the automobile steels.

Steel for Castings

When steel is cast in molds representing finished forms, it is known commercially as *cast steel.* On the other hand steel which is initially cast into ingot molds as an ingot which is then rolled, while hot, into rough forms such as billets, blooms or slabs, or into finished products like structural iron or rails, is known as *rolled steel.* It has been mechanically worked and kneaded at a high temperature.

Steel for castings is divided into two classes. In the first the carbon content is not over 0.30 per cent, with the usual phosphorous and sulphur limits. This is for ordinary steel castings for which no physical requirements are specified. Under the second class there are three grades, corresponding to carbon content of soft, medium and hard, that is, from 0.15 to 0.85 per cent carbon. The sulphur and phosphorous content is as usual. Physical requirements are specified under this class and the castings are usually heat-treated.

Owing to the heavy requirements of the railroad and automobile industries, steel used for springs have been well standardized. The classifications and analysis are shown in Table II.

Tool steels are classified as plain carbon steels or alloy steels. The carbon steels vary in carbon content depending upon the use the tool is to be put to; for example lathe tools, contain from 1.0 to 1.2 per cent carbon; wood saws, from 0.8 to 0.9 per cent; metal cutting saws, 1.6 per cent; wrenches, 0.7 to 0.8 per cent; files, 1.2 to 1.3 per cent; and auger bits, 0.5 to 0.65 per cent. Tools for high-speed cutting work are made of alloy steel which generally has the following composition:

Tungsten, 15 to 20 per cent; chromium, 3 to 5 per cent; vanadium, 0.7 to 1.75 per cent and carbon, 0.6 to 0.7 per cent. An exact analysis is as follows: Carbon, 0.67; manganese, 0.27; silicon, 0.23; tungsten, 16.5; chromium, 4.3; sulphur 0.02; phosphorous, 0.02.

Other specific examples of steels for various purposes are given in Table III.

Choice of Stock

The choice of stock* is fully as important as the heat treatment. The value of a steel depends upon two main factors, chemical composition and texture.

The standard specifications of the American Society for Testing Materials and other similar organizations, together with past experience, can be relied upon in selecting steel for any given purpose.

The chemical composition is not often checked by the heat treater but a careful examination can be made for defects in structural. Structural defects may be classified as surface defects and internal defects. A careful examination of the surface will detect laps, seams, poor workmanship, and other irregularities. Examination of a fracture of a bar will show such defects as pipes, blowholes, segregations, cracks, fissures, nonmetallic inclusions, uneven crystallization and decarbonization.

Failure of the above methods to show defects may necessitate the preparation of a polished surface and subsequent immersion in acid. A visual examination of a surface so treated will bring out hair-line cracks and segregations not detected in a fracture.

A knowledge of the metallography of iron and steel is necessary for thorough testing and correct interpretation of structural heterogenity.

Study Cartridge Fillers

An investigation of fillers for cartridges of liquid oxygen explosives is being made at the Pittsburgh experiment station of the United States bureau of mines. The work includes a study of the physical and chemical properties of fillers, the absorption of oxygen, the retention of oxygen and their effect of ingredients of the explosive mixture.

*C. Y. Clayton, private communication.

Rise of Steel Treaters Is Rapid

Society Organized Three Years Ago To Study the Art and Science of Heat Treatment Assumes Place with Other Leading Technical Organizations—Events in the Life of the Society Make Interesting History

BY E. F. ROSS

The author is editorial representative at Cleveland of IRON TRADE REVIEW.

TECHNICAL societies today play an important part in American industry. However, this has not always been true. In the early days, manufacturers conducted their plants according to their individual ideas. Competition was keen and any new development or refinement in method which made possible a better product or a reduced cost was considered a trade secret—information which under no consideration was to be given to a competitor. Standardization was almost unheard of and practically uncalled for. Industry drifted along in this fashion for many years. Gradually, however, as labor-saving machinery was invented and more modern methods of operation were developed, certain problems became common to all. As a result, manufacturers were inclined to get together and discuss their problems, thereby hoping to find a solution which would benefit all. As these groups expanded, the scope of the problems widened. This then was the start of the now highly developed industrial and technical societies.

The growth of all technical organizations has been rapid during the last 20 years, but it remained for the World war to supply a special impetus. Production was the by-word of industry during this period but the fact that high grade raw materials were not always available and also that speeded-up production was not conducive to quality created a new need for an interchange of information. Technical societies provided this opportunity. One of this country's leading technical organizations sprung into existence during the early part of the war. Shortly afterward another society of similar purpose was formed and both continued to function in the same field. After the close of the war these two forces were brought together and merged into one great society. Briefly this is the history of the American Society for Steel Treating, which from Oct. 8-12 meets in Pittsburgh for its annual convention. The incidents and events which have lead up to this form an interesting chapter in the history of American technical societies.

Credit for the first organization devoted to the study of heat treating must be given to W. P. Woodside of Detroit. In 1914 Mr. Woodside was manager of the Detroit branch of the Crucible Steel Co. of America and previously had been employed as toolsmith and tool hardener for the Cadillac Motor Co. The automobile industry was then in its infancy. The business was growing rapidly and the various plants began adding engineering staff chemists, or metallurgists as they now are known. Mr. Woodside's work brought him in contact with both the technically trained men and the practical men in the hardening room and he soon found that an unfriendly feeling existed between them, a condition which was undesirable for all concerned. Consequently, he conceived the idea of bringing these two groups together outside of working hours in a manner that they could get acquainted, compare notes and thereby learn from one another.

W. P. WOODSIDE

Mr. Woodside was founder of the Steel Treating Research society, the first heat treating society to be formed. He is manager, methods and standards department, Studebaker Corp., Detroit.

Believing it best to start with the practical men, Mr. Woodside invited about 20 men from the shop to be his guests at a dinner at the Fellowcraft club, Detroit, on March 3, 1914. At this meeting Fred O'Mara of the Sheldon School of Business Building gave an address impressing upon the men how educating themselves regarding the scientific end of their work would be of advantage to them, and how, if they associated themselves with the chemists or metallurgists of their plants, they could obtain considerable theory backed by scientific research that the practical man could make use of commercially.

After this dinner these men decided to hold another meeting on the following Saturday night. At that meeting they made a rough draft of rules and regulations and formally organized a little club called the Steel Treaters' society. This organization moved along fairly well for about four years with the metallurgists gradually becoming affiliated. Its work was noticed outside of Detroit, thus a reorganization was effected on a national basis, the new name being the Steel Treating Research society. Chapters were oragnized in Chicago, Hartford, Conn., and Indianapolis with the Detroit chapter acting as the parent organization.

Another local society interested in heat treating had sprung up in Chicago in September, 1917. This organization conducted itself as a local and continued to do so several months after the Chicago chapter of the Steel Treating Research society was established. On Sept. 18, 1918, just a year after the local club was started, a national society was founded under the leadership of T. E. Barker, then production engineer of the Miehle Printing Press & Mfg. Co. The new society was known as the American Steel Treaters' society. Its organization was prompted by a desire on the part of a group of enthusiastic men to provide for the steel treating and associated crafts of the country an organization which would function as a national clearing house for all that might contribute to the promotion of the science of heat treatment of steel. It was recognized at that time that steel had been and was then experiencing great development in its adaptation to special purposes by the introduction of new elements into its composition and the reproportioning of the older and well

T. E. BARKER

Mr. Barker was the founder and first and only president of the American Steel Treaters' society. He is service engineer with the Atlas Steel Corp., Chicago.

known elements. Furthermore, it was becoming more and more evident that if steel treating in the hands of the user was to keep pace with steelmaking in the hands of the scientifically equipped steel mill metallurgists, a machinery of national scope must be established for the transmission of new discoveries, results of isolated experiments, and knowledge of the application of newly developed alloys. The exigencies of war also made it extremely desirable that all information pertaining to the art of heat treating be made available immediately to all who could make use of it in a common cause, namely, to win the war.

While it is true that the war ended two months after organization of the American Steel Treaters' society, the conditions then prevailing and the keen appreciation of the need for definite knowledge of how to handle many of the steels prescribed for war machinery and equipment, were factors in spurring the society to far reaching activities. Cessation of the war did not remove the need for the society, consequently the organization program went ahead steadily. Regardless of whether the success of the society should be attributed to opportuneness or to those responsible for its inspiration and guidance, the result was a phenomenal growth combined with financial strength.

Officers elected to guide the American Steel Treaters' society were: President, T. E. Barker, production engineer, Miehle Printing Press & Mfg. Co. Chicago; first vice president, A. F. Boissoneau, assistant manager, A. Finkl & Sons Co., Chicago; second vice president, E. J. Janitzky, metallurgical engineer, Illinois Steel Co., South Chicago, Ill.; and secretary-treasurer, A. G. Henry, metallurgist, Illinois Tool Works, Chicago. These officers were of a progressive type and were quick to adopt a set of policies which was destined to put the society in the foreground with other leading technical organizations of the country. Just one month after the society was organized the first issue of the *Journal* was published and contained 60 pages of editorial matter devoted to heat treatment problems and society news, in addition to several pages of advertising. As the revenue from advertising covered just half of the printing bill the treasury was somewhat depleted. The publication met wide approval, however, both from advertisers and readers so that from that time on sufficient advertising space was sold to make the publication self-sustaining. As a matter of fact, many of the advertisements for the second issue were sent in without solicitation.

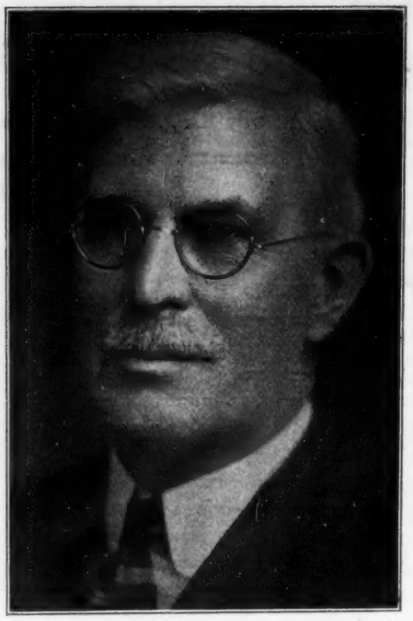
By this time the work involved in handling the affairs of the society and in editing and publishing the *Journal* had become so heavy that it was imperative to secure a business manager. Consequently the books of the society were thrown open to those interested in securing the position, thus affording the candidates an opportunity to judge the future of the organization. Following a thorough consideration of the proposition, W. H. Eisenman, superintendent of schools in a Chicago suburb, offered to pass his lot with the board of directors and to endeavor to place the society in the front rank with other technical organizations. Mr. Eisenman was appointed to the position of business manager, asuming his duties on Dec. 1, 1918. At that time the number of chapters numbered just one and the total membership was in the neighborhood of

Who Is a Steel Treater?

By W. H. EISENMAN

Secretary, American Society for Steel Treating

DURING the last few years the term "steel treater" has become one of more or less common usage in the iron and steel industry, yet considerable doubt exists as to its exact meaning. A frequent question is "Who is a steel treater?" Technically the answer is one who treats steel. Immediately one pictures a man standing before a furnace with tongs ready to introduce or remove material undergoing heat treatment. This individual often is referred to as the "man at the fire." Broadly speakly the words "steel treating" refer not only to the heat treating of iron, nonferrous metals and alloys as well as steel, but also to their mechanical treatment. In many manufacturing processes where the parts made are to be subjected to wear or stress, heat treatment is of major importance, for the finished product is only as good as its heat treatment. Therefore, many others in addition to the "man at the fire" are interested in the application of a heat treatment that will secure a superior product. Plant owners, managers, superintendents, production managers, metallurgists, inspectors, chemists, engineers and foremen may be classified as heat treaters or steel treaters. Statistics show that only 20 per cent of the metal working plants in the country have heat treating departments with trained metallurgical engineers in supervision. In the remaining 80 per cent some plant executive is in charge of this work. That plant executives and department heads are properly classified as steel treaters is attested by the fact that of the 3000 members of the American Society for Steel Treating, only about 300 or 1 per cent are "men at the fire." In the fullest sense of the term a steel treater is one interested in "promoting the arts and sciences connected with either the manufacture or treatment of metals."



J. F. KELLER

Professor Keller was president of the Steel Treating Research society at time of the amalgamation proceedings. He is engineering extension specialist, Purdue University, Lafayette, Ind.

200. His problem, therefore, was to make a national society out of a local chapter. In addition he was to handle the office correspondence, edit the *Journal* and to increase the advertising in the publication. To curtail expenses, the office was located in the corner of a machine shop and adjacent to a hobbing machine.

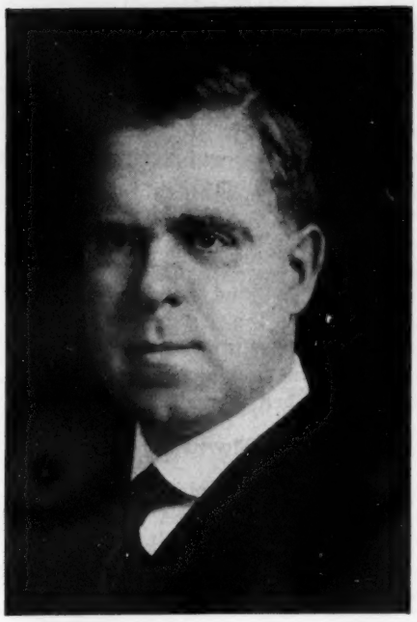
Local Chapters Organized

After a month or two spent in familiarizing himself with the work, Mr. Eisenman started out on a tour of organization, going first to Cleveland where his efforts were successful in installing a chapter, the first chairman of which was W. S. Bidle, now second vice president of the American Society for Steel Treating. From Cleveland the business manager went to Pittsburgh where the third chapter was organized. Then followed in order chatpers in Milwaukee, Philadelphia, Cincinnati, Buffalo, Rochester, and New York, so that by the time the summer vacation arrived, the society had been increased from one chapter to nine and the membership had been increased correspondingly from 200 to 700.

In the fall of 1918, A. G. Henry, national secretary and treasurer of the society had an opportunity to observe the large exposition of the American Foundrymen's association held in the Milwaukee public auditorium. Upon his return, Mr. Henry conceived the idea of conducting an exhibition of heat treating appliances and heat treated products in connection with the first national convention to be held in Chicago,

W. H. EISENMAN

Mr. Eisenman, formerly business manager of the American Steel Treaters' society, now is secretary of the American Society for Steel Treating. His office is at 4600 Prospect avenue, Cleveland.



A. E. WHITE

Lieutenant Colonel White was chairman of the amalgamation committee and first president of the new society. He is director, department of engineering research, University of Michigan, Ann Arbor, Mich.

Sept. 23-27, 1919. This plan met with approval of the national officers and board of directors, consequently Mr. Henry was appointed chairman of the exhibit committee and authorized to make all necessary arrangements. Exhibitors when approached on the subject responded readily to the idea of an exposition where heat treating equipment and heat treated products could be inspected by those who were making constant use of this equipment and material. As a result the Seventh Regiment Armory was engaged for the week of the convention. Over 50 manufacturers of steel treating products and equipment were represented at the first exposition and the project was successful in every sense of the word. Due to the fact that the national convention of the American Institute of Mining Engineers and the National Chemical exposition were held in Chicago during the same week the steel treating exposition had a great appeal. Many technical papers were presented at the convention sessions which were well attended and conducted in a manner of which older technical organizations could be proud.

Amalgamation Is Proposed

Previous to the holding of the first annual convention, Lt. Col. A. E. White, at that time on leave of absence from the engineering staff of the University of Michigan and connnected with the ordnance department of the government was successful in having a conference arranged between T. E. Barker, president of the American Steel Treaters' society and John F. Keller, president of the Steel Treating Research society at Battle Creek, Mich. Both of these men realized that the purposes of their organizations were so similar that greater good might be accomplished were it possible for the two to operate as one. Consequently each of the presidents appointed three representatives from their respective societies to meet in Chicago during the week of the convention and exposition to investigate and work out means for an amalgamation. This committee met in Chicago and for three days labored continuously getting a constitution in shape and ironing out various difficulties as to the method of procedure. Being a member of neither society, Lt. Col. White was chairman of this committee. The plan finally adopted was to be submitted to the directors and memberships of each society for approval.

Amalgamation Date Set

As the next annual convention of the American Steel Treaters' society was arranged to be held in Philadelphia, it was proposed that the two steel treating societies hold their annual convention together, with the hope that by that time a definite plan for the amalgamation of the two societies would be completed. This arrangement met with the approval of the Detroit society. The Chicago society in the meantime, had continued its active work of organizing new chapters and at the time of the opening of the Philadelphia convention the number of active chapters had been increased from nine to 20.

A mail vote conducted by both so-

A. G. HENRY

Mr. Henry, as secretary-treasurer of the American Steel Treaters' society, originated the annual exposition idea. He is representative of the Vanadium-Alloys Steel Co., Chicago.

cieties during February, 1920, showed the memberships to be overwhelmingly in favor of an amalgamation. Consequently the various necessary arrangements for the joining of the two organizations were arranged satisfactorily and the American Steel Treaters' society and the Steel Treating Research society were merged into a new society to be known as the American Society for Steel Treating at the opening session of the convention on Sept. 14, 1920. At the time of the amalgamation the officers of the American Steel Treaters' society were: T. E. Barker, president; E. J. Janitzky, first vice president; D. K. Bullens, second vice president; W. H. Eisenman, executive secretary; and A. F. Boissoneau, treasurer. The officers of the Steel Treating Research society were: John F. Keller, president; L. A. Danse, vice president; and L. S. Carrick, secretary-treasurer. Early in the spring of 1920, when an amalgamation became a certainty, a nominating committee had been appointed to select officers for the American Society for Steel Treating. At the Philadelphia convention the nominees were elected officers. They were as follows: Lieut. Col. A. E. White, professor of chemical engineering, University of Michigan, Ann Arbor, Mich., president; T. E. Barker, production engineer, Miehle Printing Press & Mfg. Co., Chicago, and T. D. Lynch, research engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., vice presidents; W. H. Eisenman, 208 N. Wabash avenue, Chicago, secretary; and W. S. Bidle, president, W. S. Bidle Co., Cleveland, treasurer.

T. D. LYNCH

Mr. Lynch is the retiring president of the American Society for Steel Treating. He is research engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

With the amalgamation, the new society had a chapter roll of 27 and a membership of approximately 2000. The convention and exposition were both held in the Commercial Museum, Philadelphia, Sept. 14-18, and were well attended. The exposition was the second of its kind to be held and again proved the enthusiasm of the various manufacturers of heat treating equipment and goods, inasmuch as they subscribed liberally for space.

Headquarters Moved to Cleveland

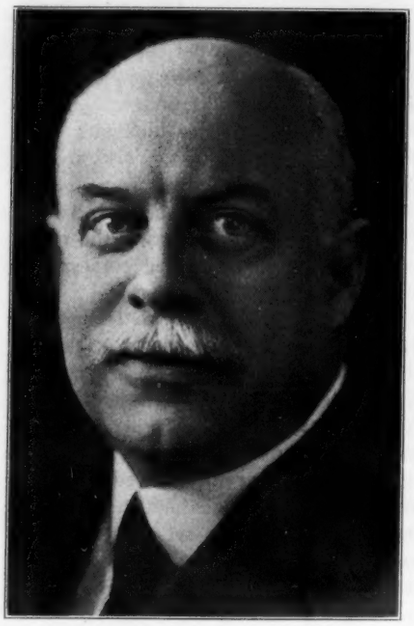
During the amalgamation proceedings it had been agreed that the society should be incorporated under the laws of Ohio and the national headquarters moved to Cleveland. Consequently on Dec. 1, 1920, the secretary moved his headquarters from Chicago to 4600 Prospect avenue, Cleveland, which location the society still retains.

The next year found the convention and exhibition held in Indianapolis, where in spite of a year of industrial depression, the number of exhibitors was satisfactory. At this convention the officers selected to carry on the work of the society during the year 1921-22 were: Frank F Gilligan, secretary-treasurer, Henry Souther Engineering Co., Hartford, Conn., president; F. C. Lau, 242 S. Kenilworth avenue, Oak Park, Ill., first vice president; R. J. Allen, metallurgist, Rolls-Royce Co. of America, second vice president; W. H. Eisenman, 4600 Prospect avenue, Cleveland, secretary; and J. V. Emmons, metallurgist, Cleveland Twist Drill Co., Cleveland, treasurer.

The annual meeting of the society in 1922 was held in the General Motors building, Oct. 2-5 and was by far the largest which had been held. In addition, the exposition was the largest the society had conducted, approximately 20,000 people attending.

Growth Has Been Satisfactory

The progress of the society during the last three years has been most satisfactory, membership having increased to around 3000. In addition, its financial position has improved gradually and at the present time compares favorably with those of other technical societies. At the present time the membership has reached a point that it has taken some organizations as long as 20 years to obtain. This rapid growth has been due primarily to the service given by the national secretary and to the appreciation on the part of those who have become members of the aims and purposes of the society. The society has adopted the policy of holding two sectional meetings each year in addition to the annual convention and during the last two years has held successful sectional meetings at Pittsburgh, Chicago, Bethlehem, Pa., and New York. During the coming winter a sectional meeting will be held in St. Louis, while in May, 1924, another will be held in Hartford, Conn. Besides the annual and two sectional meetings 226 local meetings are held by the chapters each year in 28 industrial centers. These local chapter meetings have been found to have an average attendance of 100, thus the total attendance at chapter meetings during the year may be estimated at approximately 22,000.



G. K. BURGESS

Doctor Burgess has been selected the new president of the American Society for Steel Treating. He is director, United States bureau of standards, Washington.

Over 294 members of the society are serving more than 40 technical and administrative committees in preparation of standards reports and professional papers meetings, research work and the dissemination of literature for the advancement of the metallurgical profession and the steel industry. Of this number 146 are on national committees and 148 are serving on local committees. The standards committees during the first three years was engaged primarily in mapping out a course of action and procedure. At the present time this committee is divided into four important subcommittees as follows:

Subcommittee on recommended prac-

tice for the heat treatment of tool steel.

Subcommittee on recommended practice for the treatment of steel, general line including tool steel.

Subcommittee on recommended practice for case hardening.

Subcommittee on recommended practice in pyrometry.

Two of these subcommittees already have prepared reports to be presented at the annual convention in Pittsburgh, one on the recommended heat treatment for 1 per cent carbon tool steel and 18 per cent tungsten high speed steel and the other on the use and care of pyrometers. Following their presentation these reports will be considered for adoption as tentative standards. Recognition of the society has been made by a number of other societies and organizations which have extended invitations for representatives on committees in which the American Society for Steel Treating would be interested. Such invitations have been received from the American Society for Testing Materials, American Foundrymen's association, bureau of standards, bureau of mines, war department, and others.

As a memorial to their late honorary member, Dr. Henry Marion Howe, the board of directors of the society last year established a gold medal to be known as the Henry Marion Howe medal. One of these medals will be awarded each year to the author of the paper published in the *Transactions* of the society and judged to be of the highest merit. The winner of this medal for 1922 was E. J. Janitzky, metallurgical engineer, Illinois Steel Co., South Chicago, Ill. The award of the medal for 1923 will be made at the Pittsburgh convention.

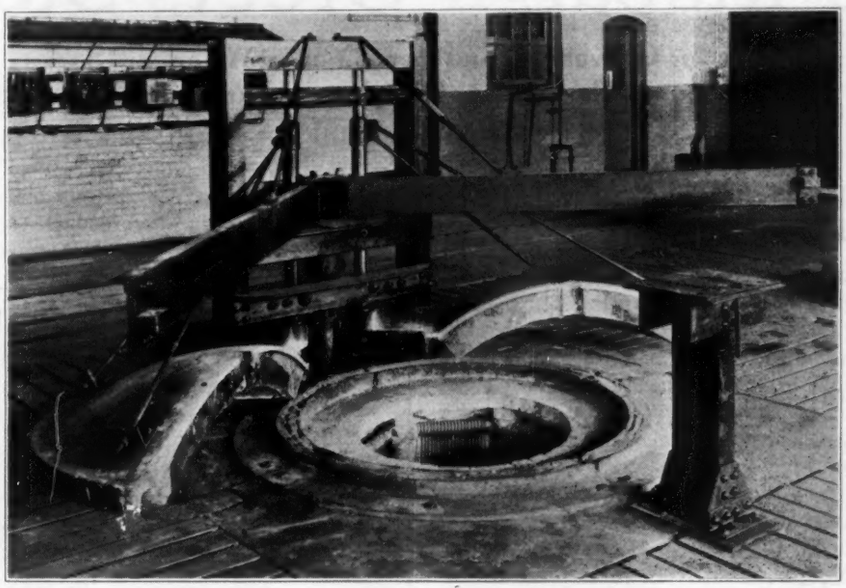
Introduces New Heating Element Support

After a long period of experimentation and a number of test installations, F. J. Ryan & Co., Philadelphia, have developed a new type of resistor refractory support for use in electrical heat treating furnaces. By this method a refractory resistor support is built up within a heating chamber, but without contact or without being connected with the main walls. The resistor support may be of any shape and is composed of interlocking refractory sections constructed on the principle of the unit system so that any desired dimension either in height, width or thickness can be obtained by employing additional sections.

An electric roll heating furnace installed at the plant of the Bethlehem Steel Co., Bethlehem, Pa., some months ago was the first commercial or practical installation of the new type of unit. It is claimed that its success has been demonstrated. The accompanying illustration shows the top of the furnace and a part of the heating element. Heat control is accomplished through a set of recording instruments composed of three units, each governing a separate stage of power within the furnace.

The furnace is used in the heat treatment of alloy steel rolls and a close and accurate temperature control is necessary in all particular parts of the furnace. While many engineers have claimed that an electric furnace is uniform in heating because of the elimination of both gas and air flow, the heating being the result of radiation from the resistors, the manufacturer of the new furnace maintains that this contention is incorrect in several details and that it is possible to have nonuniform conditions which would not be shown by using only a single point recorder and a single zone of heating control.

Distinctive advantages which have been claimed for the new type of resistor support are: 1. Prevention of nonuniform heat seepage as a result by eliminating resistor contact with furnace walls; 2, allowance for correction of improperly proportioned resistor sections; 3, complete rearrangement of heating made possible should a future change of operation necessitate it; and 4, broken sections of the resistor support may be replaced within a few minutes without injury to the furnace structure.

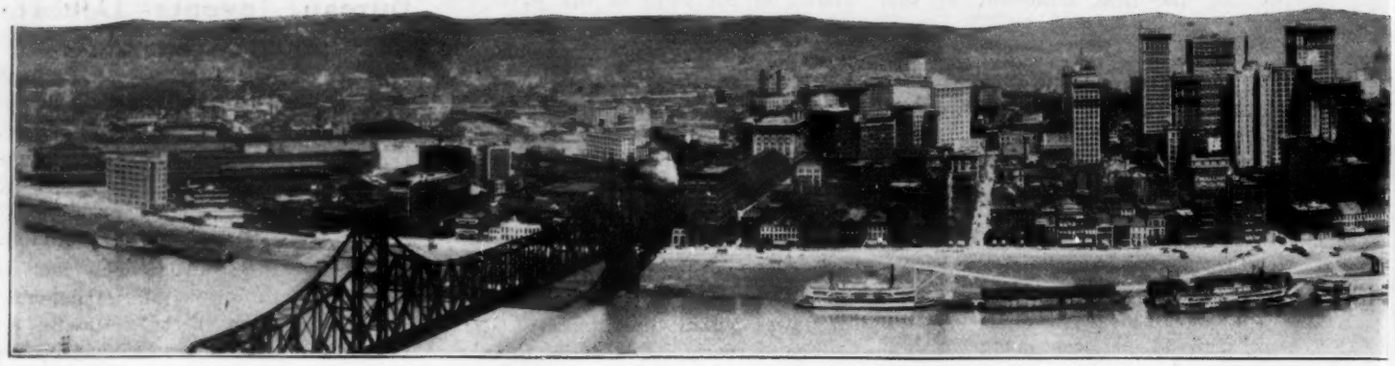


ELECTRIC ROLL HEATING FURNACE WHICH HAS A NEW TYPE REFRACTORY RESISTOR SUPPORT AND THREE ZONES OF HEAT CONTROL

Bureau Invents Delicate Optical Strain Gage

A new optical strain gage perfected recently by the bureau of standards, Washington, for measuring the stretching of steel or other material under load will measure a change of length of 1/250,000-inch. That part of the instrument which is applied to the material is only 2 inches long and is extremely light so that it is adaptable for testing thin sheets of metal or other light materials. An eyepiece is used for reading the gage, this consisting of an instrument similar to a telescope in appearance and containing lenses, a scale and a lamp for illuminating the scale. The optical system is of such a nature that the instrument will read correctly to within 0.1 per cent if it is pointed within 2½ degress of perpendicular to the gage. It gives unmistakable indication of being pointed correctly.

The gage itself has two knife edges which are set into the material under the test. One is fixed in position, while the other can turn through a small angle to allow for the change in length of the material between the two edges. To the movable knife edge is attached a mirror which is one of a set of mirrors which reflect back to the eyepiece the image of an illuminated mark contained therein. This mark is projected on the scale in the eyepiece and before the load is applied the gage is adjusted to make this mark coincide with the zero on the scale. Thereafter the scale reads directly the extension of the material to which the gage is fastened.



The panorama of Pittsburgh—the steel city—is impressive. Iron, steel and coal are the principal products of this

Pittsburgh Greets Steel Treaters

Plans for Convention and Exposition of American Society for Steel Treating at Motor Square Garden Are Complete — Extensive Program Provides for Technical Sessions, Plant Visitation and Entertainment

PITTSBURGH will be the host to members of the American Society for Steel Treating when the annual convention is held in that city next week, Oct. 8-12. Judging from the interest now being manifested, the attendance this year will far surpass that of any of the four previous meetings. In accordance with the policy which has been followed before, the society will hold an exposition of heat treating equipment and heat treated products, as well as a wide line of accessory materials. This exhibition, which is conducted in conjunction with the annual convention, offers excellent opportunity for members of the society to inspect the latest products, and has come to be considered as one of the features of the convention, chiefly for its educational value.

An extensive program has been prepared, a summary being given in the accompanying box. Many papers will be presented at the technical sessions and a broad line of subjects will be discussed. A notable change has been made in the general arrangement of the program by which the opening of the exhibition hall does not conflict with the more important technical sessions. With the exception of Thursday and Friday, the exhibition hall will not be opened until 1:00 p. m., thus allowing the morning free for the various meetings. Morning technical sessions will be held at the William Penn hotel, the headquarters for the convention, and the afternoon sessions will be held at Motor Square Garden, the hall in which the exhibition will be located. Under the new arrangement nothing will detract from the presentation of the important papers.

Condensed Program

Monday, Oct. 8

10:00 a. m.—Technical session, William Penn hotel.
1:00 p. m.—Registration.
1:00 p. m. to 10:00 p. m.—Exposition open.
3:30 p. m.—Technical session, Motor Square Garden.
7:00 p. m.—Moving pictures.

Tuesday, Oct. 9

9:30 a. m.—Technical session, William Penn hotel.
12:10 p. m.—Plant visitation, Westinghouse Electric & Mfg. Co.
1:00 p. m. to 10:00 p. m.—Exposition open.
3:30 p. m.—Round table discussion, Motor Square Garden.
7:00 p. m.—Moving pictures.
9:30 p. m.—Entertainment and smoker, William Penn hotel.

Wednesday, Oct. 10

9:30 a. m.—Annual business meeting, William Penn hotel.
1:00 p. m. to 10:00 p. m.—Exposition open.
2:00 p. m.—Plant visitation, Carnegie Steel Co.
3:30 p. m.—Technical session, Motor Square Garden.
7:00 p. m.—Moving pictures.
9:30 p. m.—Annual dance, William Penn hotel.

Thursday, Oct. 11

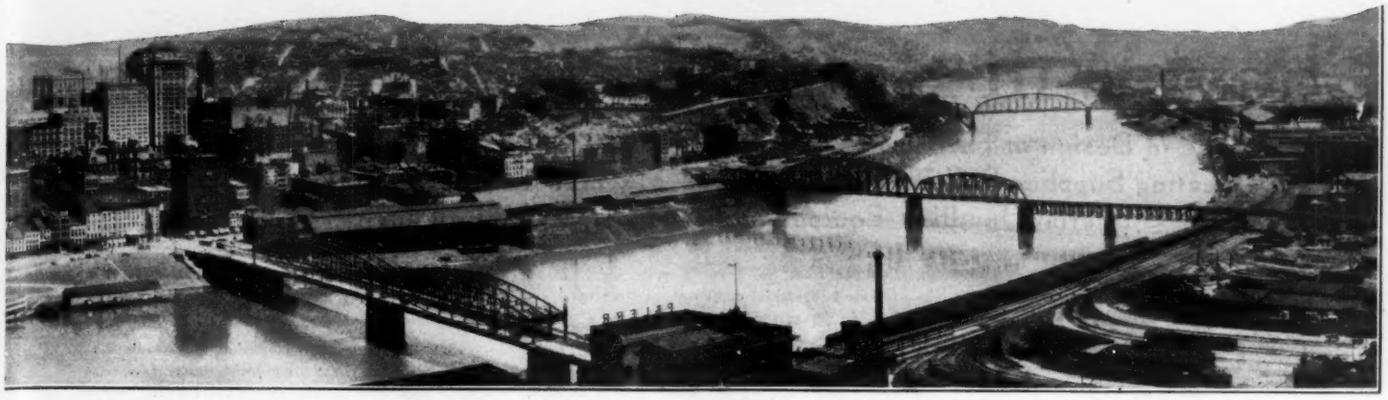
9:30 a. m.—Technical session, William Penn hotel.
10:00 a. m. to 5:30 p. m.—Exposition open.
2:30 p. m.—Hardness testing symposium, Motor Square Garden.
6:30 p. m.—Annual banquet, Fort Pitt hotel.

Friday, Oct. 12

9:30 a. m.—Technical session, William Penn hotel.
10:00 a. m. to 10:00 p. m.—Exposition open.
12:00 m.—Plant visitation, National Tube Co.
2:30 p. m.—Symposium on metallurgical education, Motor Square Garden.
4:00 p. m.—Committee A-4, American Society for Testing Materials, William Penn hotel.
7:00 p. m.—Moving pictures and band concert.

Included in the subjects to be discussed at the convention are furnace fuels, tempering, annealing, manufacture of sheet steel, case hardening, spark testing, hardness testing, aging of steel, and other subjects relating to the problems of the steel treater. Round-tables and symposiums will be held in the afternoons in the meeting room at the Motor Square Garden. One of the important round tables will be in charge of the standards committee when the reports of the committees on heat treatment of steel and on pyrometry will be presented and discussed by the members. A number of the papers to be presented have been printed in the society's publications, thereby inviting discussion. At 4 p. m. Friday, committee A-4 of the American Society for Testing Materials will hold a meeting at the William Penn hotel.

The main floor and basement of the Motor Square Garden, totaling over 50,000 square feet of floor space, will be required to house the booths at the exhibition. As the membership in the society has increased, interest in the annual exhibition has developed with a resulting enlargement in the scope of the materials shown. This year 145 companies will display the most improved materials and equipment in their respective lines. Much of the mechanical equipment, such as the various types of furnaces; machine tools, including metal cutting saws, grinding machines, drilling machines, punches, etc., will be shown in operation. Other products which will be shown are hardening compounds, refractories, cutting oils, tool



great city. Three navigable rivers—the Allegheny, Monongahela and Ohio—add much to its industrial advantage

and alloy steels, various types of recording instruments, testing machines and many other accessories especially applicable to the field of heat treatment. As has been mentioned already the exhibition will open at 1 p. m. daily with the exception of Thursday and Friday when the hall will be opened at 10 a. m. To accommodate the men in industrial plants in the vicinity of Pittsburgh who will be unable to attend during the day, the exhibition will be open each night, with the exception of Thursday night, until 10 p. m. On the following pages of this issue are listed the companies showing materials at the exhibition together with a brief description of the products that will be on display.

How To Reach Motor Square Garden

MOTOR Square Garden, where the exposition of the American Society for Steel Treating is to be held, is located in the eastern part of Pittsburgh and occupies an entire block bounded by Baum boulevard, Beatty street, Center avenue and Trade street. To reach the exposition by trolley car from the William Penn hotel, walk one block west on Oliver avenue to Smithfield street and one block south on Smithfield to the corner of Smithfield street and Fifth avenue. Take an east bound car marked 82. Cars going out Liberty avenue and marked 86 also may be used. By automobile Motor Square Garden may be reached by following the Lincoln Highway, which follows Bigelow boulevard to N. Craig street, south on Craig to Baum boulevard and out Baum boulevard to the exposition hall which is between Trade and Beatty streets.

Pittsburgh, as one of the leading centers in the production of steel and the manufacture of steel products affords an excellent opportunity for plant inspection, and for this reason a series of trips to nearby plants have been arranged. The schedule of trips is as follows: Tuesday afternoon, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; Wednesday afternoon, Homestead works, Carnegie Steel Co., Homestead, Pa.; Friday noon, National Tube Co., McKeesport, Pa. In addition to the regular schedule, many of the tool steel plants in the vicinity of Pittsburgh are making arrangements to conduct private inspecting parties through their plants.

The social entertainment of the convention has not been neglected, the feature event being the annual banquet which will be held in the Fort Pitt hotel, Thursday at 6:30 p. m. Several men of national prominence will speak at the banquet. A smoker and entertainment program has been arranged for Tuesday evening while an informal dance will be held in the ballroom of the William Penn hotel Wednesday evening. A band concert is scheduled for Friday at 7 p. m. at Motor Square Garden.

Ladies Will Be Entertained

Special entertainment will be provided for the ladies who visit Pittsburgh. During the convention the headquarters for the ladies will be at the William Penn hotel and all trips, visits and parties will start from there. The complete schedule of entertainment for the ladies is as follows: Monday afternoon, luncheon at the William Penn hotel at 1 p. m., followed by a short auto ride about the city; Monday evening, visit to the exhibition hall; Tuesday afternoon, auto ride to points of interest in and around Pittsburgh; Tuesday night, theater party at the Davis vaudeville theater; Wednesday morning, auto ride with luncheon at the H. J. Heinz Co., followed by a tour through the factory; Wednesday evening, annual dance of the American Society for Steel Treating in the ballroom of the William Penn hotel; Thursday afternoon, auto ride; Thursday night, annual banquet of the society.

One of the features of the convention will be the presentation of the Henry Marion Howe medal. The board of directors last year established this medal as a memorial to the late Dr. Henry Marion Howe, an honorary member of the society. The medal is presented annually to the author of the paper published in *Transactions* and judged of the highest merit of all papers published during the year. The winner for 1922 was E. J. Janitzky, Illinois Steel Co., Chicago. The winner for 1923 will be announced during the convention and both the medals for 1922 and 1923 will be presented at the same time.

J. TRAUTMAN JR.

Mr. Trautman is general chairman of the Pittsburgh local convention committee. He is general sales manager, Colonial Steel Co., Pittsburgh.

Show Will Reflect 1923 Progress

Advance in Design of Furnaces, Control Apparatus, Forging Equipment, and Heat Treating Supplies Will Be Demonstrated—Machine Tools, Alloy Steels and Material Handling Equipment To Be Displayed Prominently

AIR REDUCTION SALES CO., New York—This company will exhibit welding and cutting equipment and will give demonstrations of circular, straight line and angular cutting. Photographs of various phases of oxyacetylene cutting and welding will be shown. Represented by G. Van Alstyne, F. E. Rogers, Harold Grow, W. A. Warfel and Alexander Blaser.

AMERICAN CAR & FOUNDRY CO., New York—This company will exhibit two-electrode and three-electrode heaters and a 4-foot heater for heating rivets and rods. F. C. Cheston, John S. Helt and W. C. Helt will represent the company.

AMERICAN GAS FURNACE CO., Elizabeth, N. J.—A large variety of photographs will be on display, and a number of furnaces will be in operation at the industrial laboratory of the Equitable Gas Co. in Pittsburgh. Representatives will be John Mehrman, Theodore Farwick Jr. and Philip C. Osterman.

AMERICAN METALLURGICAL CORP., Boston—An electric furnace, 12x24 inches and having a capacity for heating 150 pounds of material per hour to 1500 degrees Cent. is to be exhibited by this company; represented by Kristian A. Juthe.

AMERICAN STAINLESS STEEL CO., Pittsburgh—Stainless steel automobile parts, castings, cutlery, dies, golf clubs, harness fittings, springs, surgical instruments, turbine blades, wire, etc. will make up the display of this company. Represented by John C. Neal and C. S. Bunting.

AMERICAN TOOL WORKS CO., Cincinnati—This company will exhibit lathes, planers, shapers, radial dril's, etc.

ARMSTRONG-BLUM MFG. CO., Chicago—This company will demonstrate hack saw machines, an automatic high-speed saw, metal band saw, punching, shearing and bending machines, under the supervision of Harry J. Blum.

ARMSTRONG CORK & INSULATION CO., Pittsburgh—This exhibit will include insulating brick for furnaces and ovens, high pressure covering, blocks and cement for high temperature equipment, corkboard for storage rooms, cork covering for brine, ammonia and refrigerating drinking water lines, and cork tile floors. R. S. Findley, L. W. Bertelson and F. C. Young will be in charge of the booth.

ATKINS, E. C. & CO., Indianapolis— A display of metal cutting saws for circular saw machines, hack saw machines, metal cutting, band saw machines, metal band saw blades, hack saw blades and frames, pattern or foundry plates, belt wax, hand saws, dado heads, grooving saws, pattern makers' saws, etc., will be exhibited by this company. E. S. Norvell, B. D. Thompson and W. H. Albaugh will be in charge.

ATLAS STEEL CORP., Dunkirk, N. Y.—Applications of tool steels and special steels, articles made therefrom and specimens of fractures of steels in various conditions will make up the exhibit of this company. Howard Reese will be in charge.

AVEY DRILLING MACHINE CO., Cincinnati—This company will have on display one No. ½ drilling machine with speeds up to 12,000 revolutions per minute; one 3-spindle No. 2 machine with one spindle hand feed with tapping attachment, one spindle semiautomatic feed and

Alphabetical List of Exhibitors

Exhibitor	Space No.
Air Reduction Sales Co.	S137
American Car & Foundry Co.	69
American Gas Furnace Co.	S105
American Metallurgical Corp.	—
American Stainless Steel Co.	S116
American Tool Works Co.	92
Armstrong-Blum Mfg. Co.	78
Armstrong Cork & Insulation Co.	52
Atkins, E. C., & Co.	S123
Atlas Steel Corp.	19
Avey Drilling Machine Co.	59
Babcock & Wilcox Tube Co.	S107
Bacharach Industrial Instrument Co.	99B
Baker Bros.	89
Bausch & Lomb Optical Co.	95
Bellevue Industrial Furnace Co.	96
Bellis Heat Treating Co.	36A
Bethlehem Steel Co.	14 and 23
Blanchard Machine Co.	85
Bristol Co.	99
Brown Instrument Co.	9
Bullard Machine Tool Co.	87
Bureau of Standards	S104
Calorizing Co.	47
Carnegie Institute of Technology	S149
Carnegie Library	S149
Case Hardening Service Co.	38
Celite Products Co.	1
Central Steel Co.	35
Champion Sales Co.	S112
Chicago Flexible Shaft Co.	98
Cincinnati Grinder Co.	90
Cincinnati Milling Machine Co.	90
Cleveland Steel Tool Co.	36B
Climax Molybdenum Co.	53 and 62
Colonial Steel Co.	33 and 42
Combustion Utilities Corp.	94 and 95
Crescent Washing Machine Co.	93
Crucible Steel Co. of America	13
Cutler Steel Co.	S111
Davison, N. C., Gas Burner & Welding Co.	99A
Dearborn Chemical Co.	41
Dempsey Furnace Co.	97
Disston, Henry, & Sons, Inc.	S115
Driver-Harris Co.	4
Electrical Refractories Co.	S101A
Englehard, Charles, Inc.	32
Equitable Gas Co.	S130
Federal Machine & Welder Co.	S119
Finkl, A., & Sons	53
Firth Sterling Steel Co.	3
Ford, J. B., Co.	31
Forging-Stamping-Heat Treating	43
Fuels and Furnaces	S142
General Alloys Co.	28
General Electric Co.	76 and 77
Giddings & Lewis Machine Tool Co.	86
Goddard & Goddard Co.	79
Gould & Eberhardt	85
Hagan, George J., Co.	66
Halcomb Steel Co.	22
Hamilton, W. E., & Associates	S102
Haskins, R. G., Co.	S141
Hauck Mfg. Co.	18
Haynes Stellite Co.	51
Hendey Machine Co.	57
Heppenstall Forge & Knife Co.	6-8
High Speed Hammer Co., Inc.	S109
Holcroft & Co.	S143
Homestead Valve Mfg. Co.	S101
Hoover Steel Ball Co.	S100
Hoskins Mfg. Co.	70
Houghton, E. F., & Co.	45
Hunter Saw & Machine Co.	S125
Hybinette, Victor	—
International Nickel Co.	37 and 46
Interstate Iron & Steel Co.	49 and 50
Iron Age	21
IRON TRADE REVIEW	73
Jones & Laughlin Steel Corp.	26
Keller Mechanical Engineering Co.	88
King Refractories Co.	44
Kinite Co.	S114
Kleist, Charles, & Son	40B
Laughlin-Barney Machinery Co.	57-60
Lavino, E. J., & Co.	S146
Leeds & Northrup Co.	71 and 80
Leitz, E., Inc.	S110
Linde Air Products Co.	S117
Ludlum Steel Co.	56 and 65
McCoy-Brandt Machinery Co.	S121, S122
Machinery	40A
Mahr Mfg. Co.	54
Mathews, James H., & Co.	2
Midvale Co.	81
Molybdenum Corp. of America	27
Motch & Merryweather Machinery Co.	82 and 85-92
National Automatic Tool Co.	91
National Machinery Co.	12
National Twist Drill & Tool Co.	S136
Nutall, R. D., Co.	S113
Obermayer, S., Co.	63
Ohio Machine Tool Co.	60
Ohio Steel Foundry Co.	15
Oilgear Co.	58
Oliver Instrument Co.	58
Olsen, Tinius, Testing Machine Co.	72
Pangborn Corp.	74, 75, 83 and 84
Pannier Bros. Stamp Co.	S126
Park Chemical Co.	S108
Peerless Machine Co.	S135
Pels, Henry & Co.	S144
Pennsylvania Pump & Compressor Co.	92A
Penton Publishing Co.	73
Pittsburgh Crucible Steel Co.	S120
Pittsburgh Instrument & Machine Co.	S124
Quigley Furnace Specialties Co.	61
Racine Tool & Machine Co.	S140
Ransom Mfg. Co.	92
Rockwell, W. S., Co.	24
Rodman Chemical Co.	20
Roessler & Hasslacher Chemical Co.	S131
Ryan, F. J., & Co.	S132
Scientific Materials Co.	S128
Shore Instrument & Mfg. Co.	S133
Skybryte Co.	S148
Spencer Turbine Co.	64
Steel City Testing Laboratories	S150
Surface Combustion Co.	17
Swedish Crucible Steel Co.	S147
Swindell, William & Bros.	S103
Tacony Steel Co.	48
Tate-Jones & Co., Inc.	S129
Taylor Instrument Co's.	34
Union Electric Steel Corp.	55
United Alloy Steel Co.	10, 11
United States Chain & Forging Co.	S134
V. & O. Press Co.	86
Vanadium-Alloys Steel Co.	29, 30
Vanadium Corp. of America	16 and 25
Vulcan Crucible Steel Co.	S127
Warner & Swasey Co.	S118
Westinghouse Electric & Mfg. Co.	67, 68
Wilson-Maeulen Co.	S138, S139
Witherow Steel Co.	36

one spindle full automatic feed; also one single-spindle No. 3 machine with power feed. Represented by J. G. Hey, and J. F. Mirrielees.

BABCOCK & WILCOX TUBE CO., Beaver Falls, Pa.—This exhibit will consists of seamless steel tubes. H. N. Murray will be in charge of the booth.

BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh—Pyrometers and electrical carbon dioxide meters will make up this exhibit which will be supervised by H. Bacharach.

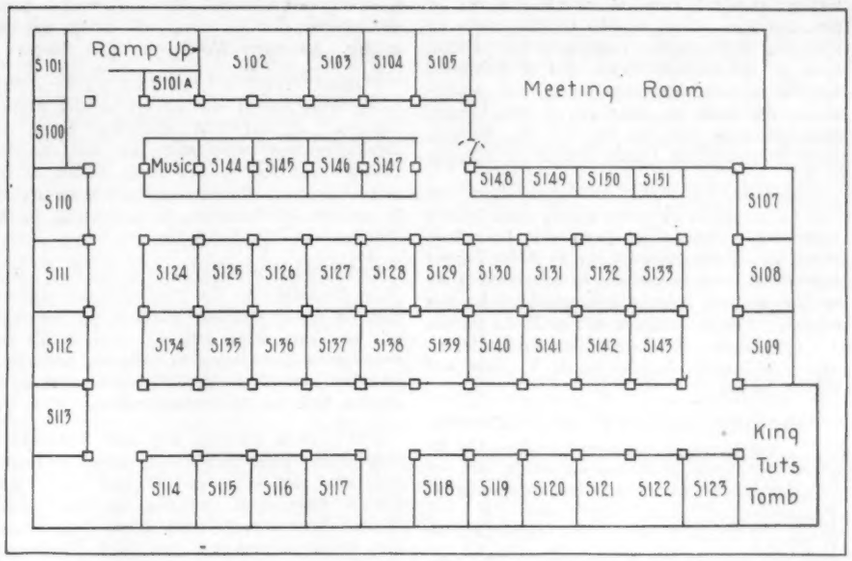
BAKER BROS., Toledo, O.—A light heavy-duty drilling and boring machine will be exhibited in connection with other machine tools in the booth of Motch & Merryweather Machinery Co. W. W. Elliott and H. L. Tigges will attend.

BAUSCH & LOMB OPTICAL CO., Rochester, N. Y.—A new and large model metallographic outfit, three smaller models and the usual line of microscopes and accessories will be shown. W. L. Patterson and I. L. Nixon will be in charge.

BELLEVUE INDUSTRIAL FURNACE CO., Detroit—This company will have in operation a vertical complete muffle high-speed steel furnace equipped with a carborundum muffle in connection with special fuel control and recording instruments. An aluminum melting furnace and various shapes of fire tile also will be shown. In charge of the booth will be Walter E. Hinz and L. J. Raymo.

BELLIS HEAT TREATING CO., New Haven, Conn.—A heating medium for hardening and tempering carbon, high-speed and alloy steels will be on display under the supervision of A. E. Bellis and J. W. Black.

BETHLEHEM STEEL CO., Bethlehem, Pa.—This display will be educational in character and will show the quantities of the various materials which enter the coke ovens, blast furnaces and open-hearth furnaces, together with the quantity of the different materials obtained from each. R. M. Bird, A. P. Spooner, R. H. Christ, A. D. Shankland, W. L. Trumbauer, Henry Wysor, C. E. Chamberlain and G. A. Richardson will attend.



MANY EXHIBITORS WILL DISPLAY THEIR PRODUCTS AT BOOTHS ON THE SUBFLOOR

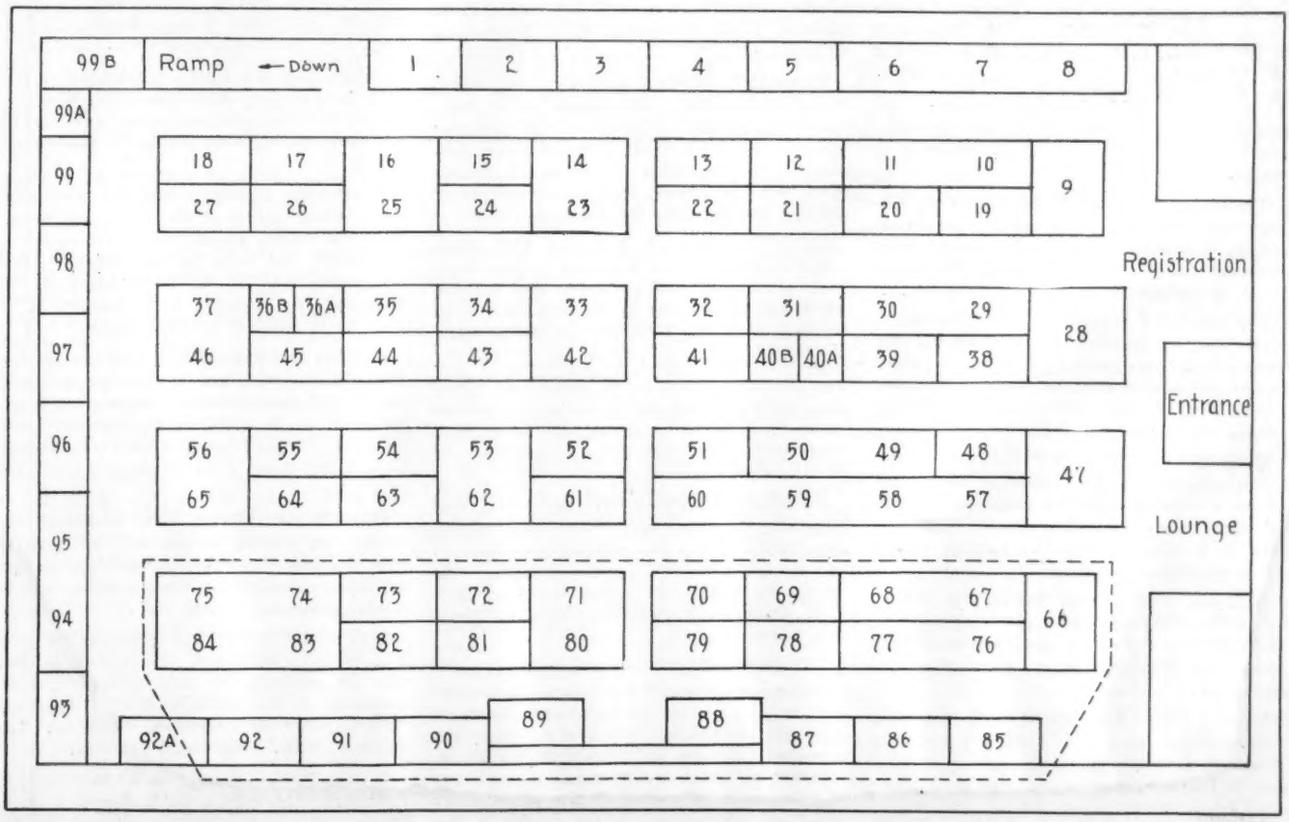
BLANCHARD MACHINE CO., Cambridge, Mass.—Vertical face grinding machine of the direct motor-driven type with caliper attachment, samples of work done by the machine and several photographs will be shown. F. E. Bartley will be in charge of the booth.

BRISTOL, CO., Waterbury, Conn.—The company's entire line of recording instruments for pressure, temperature, humidity, electricity, time, motion, speed, etc., will be displayed under the direction of Roy M. Walker.

BROWN INSTRUMENT CO., Philadelphia—This company will exhibit indicating and recording pyrometers, thermometers, pressure gages, tachometers, hydrogen ion recorders for recording alkilinity and acidity, oxygen content recorders, carbon dioxide recorders, and indicating and recording temperature control, signalling and alarm instruments. The representatives will be George W. Keller, G. L. Clapper, F. Q. Thorp, D. C. Mayne, A. C. Hanson, P. E. Hemmerle, C. L. Simon and M. M. Watkins.

BULLARD MACHINE TOOL CO., Bridgeport, Conn.—This company will exhibit several machines of its own manufacture.

BUREAU OF STANDARDS, Washington—Equipment which is at the United States bureau of standards for research work and



PLAN SHOWING LOCATION OF BOOTHS ON MAIN FLOOR OF MOTOR SQUARE GARDEN, WHERE THE EXHIBITION IS TO BE HELD

testing, standard chemical samples, a set of precision gage blocks, samples to illustrate metal spraying, photographs, transparencies, publications of metallurgical work and a projection lantern in continuous operation, will demonstrate the field of activities of the bureau. Representatives will be Dr. G. K. Burgess, H. J. French, T. G. Digges and O. Z. Klopsch.

CALORIZING CO., Pittsburgh—Recuperators for industrial furnaces; sheets, pipe, fittings, bolts and various other parts that have been subjected to temperatures up to 1700 degrees Fahr., and castings for use in temperatures up to 2200 degrees Fahr. will be exhibited by this company. Representatives will be B. L. Jarrett, E. L. Malone, G. D. Mantle, B. J. Sayles, Harry Miller, E. L. Smith, A. V. Farr and G. L. Davis.

CARNEGIE INSTIUTE OF TECHNOLOGY, Pittsburgh—Literature describing the institution's metallurgical courses which are of most interest to steel treaters will be distributed. Photographs of several departments of the school will be on display. The exhibit will be under the supervision of F. J. Hartman.

CARNEGIE LIBRARY, Pittsburgh—A display of photographs and technical literature will be under the supervision of Mr. McClelland.

CASE HARDENING SERVICE CO., Cleveland—Case hardening and cyanide hardening compounds, and a paint which protects the metal from the carbonizing gases during the hardenings process will be exhibited by this company. It will be represented by W. C. Bell, E. J. Gossett and J. S. Ayling.

CELITE PRODUCTS CO., Chicago—Heat insulation products and a blow torch test of their resistance to heat flow will constitute the display of this company. E. A. Phoenix, and W. T. Kennedy will be in charge.

CENTRAL STEEL CO., Massillon, O.—The exhibit of this company will consist of enlarged photographs of plant operations and a display of finished parts made from alloy steel. Represented by F. J. Griffiths, J. M. Schlendorf, B. F. Fairless, E. C. Smith, C. P. Richter and W. W. Leffler.

CHAMPION SALES CO., Pittsburgh—This exhibit will consist of metal window ventilators and other special products; E. C. Sattley is in charge.

CHICAGO FLEXIBLE SHAFT CO., Chicago—An oven furnace and another furnace using liquid heating media will be shown; Peter Blackwood, O. C. Bernhard and J. W. Lazear being in charge.

CINCINNATI GRINDER CO., Cincinnati—A motor-driven grinding machine, special duty headstock for die work and a set of speed change and reverse units will be shown. Arthur C. Hoefinghoff and Walter F. Stegner will attend.

CINCINNATI MILLING MACHINE CO., Cincinnati—Vertical and universal milling machines, a cutter grinder and centerless and universal grinders will be exhibited. W. W. Tangeman, J. E. Caster and L. V. Johnson will be in attendance.

CLEVELAND STEEL TOOL CO., Cleveland—This company will have on display the following items: Punches, dies, pneumatic chisel blanks and rivet sets. R. J. Venning will be in charge.

CLIMAX MOLYBDENUM CO., New York—Molybdenum steel and products made from it will be shown; represented by B. F. Phillipson, J. D. Cutter and W. N. Bratton.

COLONIAL STEEL CO., Pittsburgh—Tool steel and special open-hearth steels, hardened fractures, raw materials and alloys used in process of manufacture, etc., will make up this exhibit. Lawrence Wood will be in charge.

COMBUSTION UTILITIES CORP., New York—This exhibit will consist of tool heating furnaces, oil and lead tempering baths, recuperative and nonrecuperative heat treating furnaces and one or two small models of the large furnaces. Representatives will be H. M. Henry, W. L. Frederick, P. J. Nutting, F. W. Manker and W. B. Kipfer.

CRESCENT WASHING MACHINE CO., New Rochelle, N. Y.—This company will exhibit a metal cleaning machine for removing oil, lubricants, chips, grit, etc., from metals and metal parts preparatory to finishing, enameling, or other processing. J. F. Donovan and E. C. Arndts will be the representatives.

CRUCIBLE STEEL CO. OF AMERICA, New York—This exhibit will consist of crucible and alloy steels in various tool forms with several illustrations showing the development of well known tools made from these grades. The representatives will be R. A. McDonald, C. M. Johnson, A. E. Van Cleve, M. S. Dravo, C. E. Hill and J. W. Taylor.

CUTLER STEEL CO., Pittsburgh—Heat resisting alloys in various forms such as castings, sheets, bars, and wire will be shown by this company which is to be represented by W. H. Waddington, A. S. Lambie, W. F. Furman, F. B. Foster and T. R. Heyward Jr.

DAVISON, N. C., GAS BURNER & WELDING CO., Pittsburgh—Gas and fuel oil burners in furnaces, and a line of gas and oil burners for boilers and all types of industrial furnaces will be shown by this company. Represented by N. C. Davison, Edward Poor and M. E. Kuhn.

DEARBORN CHEMICAL CO., Chicago—This company will exhibit rust prevention compounds, cleaning preparations, quenching and tempering oil and literature describing these products. E. M. Converse, J. A. Crenner, E. K. Thomas, C. C. Brown and C. I. Loudenback will attend.

DEMPSEY FURNACE CO., Jersey City, N. J.—This exhibit will consist of a high-speed steel furnace in operation; oil and gas burners, and an electrically operated boiler room regulator for operating stoker speed, blower speed and damper. H. B. Dempsey and F. J. Spillane will represent the company.

DISSTON, HENRY, & SONS, INC., Philadelphia—Milling saws, hot saws, friction saws, hack saws, tools and a milling saw machine will be on display under the superivision of J. L. Dorrington, Walter Newmand and E. S. Ludy.

DRIVER-HARRIS CO., Harrison, N. J.—This exhibit will consist of carbonizing boxes, pots, retorts, furnace muffles and parts, conveyor chains and similar equipment for other high temperature work, and will be superivised by H. D. McKinney.

ELECTRICAL REFRACTORIES CO., East Palestine, O.—Refractory shapes used as furnace linings, muffles for resistance type furnaces, and insulating supports for the resistance coils on electric ranges will constitute this exhibit. F. E. Owen, C. W. Williams and F. C. Simms will attend.

ENGELHARD, CHAS., INC., New York—Automatic temperature regulators, thermoelectric pyrometers, electric resistance thermometers and thermostats, indicating and recording instruments for gas analysis, an autographic instrument for measuring temperature co-efficient of expansion, and a complete line of refractory porcelains are included in the exhibit of this company. Representatives will be J. Kremer, H. F. Roberts, J. H. Oetjen, C. W. Hubbard and R. W. Newcomb.

EQUITABLE GAS CO., Pittsburgh—Information will be given and question answered regarding the supply and use of natural gas for heating and other industrial purposes. Representatives will be R. E. Polk, C. H. Whitwell, E. F. Koch, E. L. Flowers and C. J. Long.

FEDERAL MACHINE & WELDER CO., Warren, O.—This company will demonstrate the operation of a flashproof electric butt welder with a capacity up to 1½-inch round steel. A. V. B. Cutler and J. H. Rush will be in charge.

FINKL, A., & SONS CO., Chicago—Steel products to be used for die blocks, piston rods, inserts, trimmer steels, upset headers, sliding dies, etc., will be displayed. Representatives will be E. H. Graham, T. P. Wallace, F. M. Erb, C. E. Finkl, F. Finkl, W. Finkl and W. Graham.

FIRTH-STERLING STEEL CO., McKeesport, Pa.—This company's exhibit will consist principally of high-speed tool and die steels and a stainless steel. Other representatives will be Edwin T. Jackman, D. G. Clark, A. C. Leet, Robert Kimber, A. E. Barker, H. I. Moore, Charles von Schlutter, Harry Jarvis, Frederick Jarvis, D. E. Jackman Jr., G. J. Bauer, H. S. Norman, W. A. Nungester, W. C. Royce, L. E. Tegardine, J. A. Wotan, T. A. Larecy, R. H. Hallagan and M. E. Burkemer.

FORD, J. B. CO., Wyandotte, Mich:—This exhibit will comprise a display of cleaning compounds and a specimen air agitation tank. B. N. Goodell and H. J. Smith will attend.

GENERAL ALLOYS CO., Boston—Will exhibit heat treating containers, boxes, pots retorts and castings under the supervision of H. H. Harris, E. P. Van Stone, W. K. Leach and A. L. Grinnell.

GENERAL ELECTRIC CO., Schenectady, N. Y.—Three electric heat-treating furnaces will constitute this exhibit. Represented by A. N. Otis, E. F. Collins, Walker Anderson, C. L. Stott, R. A. Tophan and C. T. McLoughlin.

GIDDINGS & LEWIS MACHINE TOOL CO., Fond du Lac, Wis.—One of the company's horizontal boring mills with motor drive will be exhibited. George Cole and E. V. Wenzell will attend.

GODDARD & GODDARD CO. INC., Detroit—Milling cutters of the profile and formed types, slab millers, channelling cutters, and [illegible] ing cutters will make up this display. Representatives will be A. N. Goddard, J. W. Sederquist, Dix Proctor, E. E. Guntert, R. T. Rice, C. H. Wallace and Mr. Sample.

GOULD & EBERHARDT, Newark, N. J.—This company will have in operation a 32-inch shaper with direct-connected, constant-speed, motor drive, to be exhibited in connection with Motch & Merryweather Machinery Co. display. C. L. Cameron and Albert Miller will attend the exhibition.

HAGAN, GEORGE J., CO., Pittsburgh—An electric heat-treating furnace will be displayed with literature on various installations of electric furnace equipment. Representatives will be R. E. Talley, C. F. Cone and A. D. Dauch.

HALCOMB STEEL CO., Syracuse, N. Y.—Tool and alloy steels with parts made from them will be exhibited by this company; represented by S. C. Spalding, H. J. Stagg, and Messrs. Galbraith, Atkinson, Schroeder, Talmadge, Kissam, Boland and Schnibbe.

HAMILTON, W. E., & ASSOCIATES, Pittsburgh—This exhibit will consist of a truck, tractor and trailer, elevating platform trucks, electric hoists, sand blast, paint spray, rivet

forges; oil, gas and acetylene burners; disk fans and blower; mushroom and aisle ventilators and air diffusers. W. E. Hamilton, G. N. Seidel, S. D. Barkman, Robert Sherman and M. C. Drake will be present.

HASKINS, R. G. CO., Chicago—This exhibit will comprise a display of flexible shaft equipment and portable tools for drop forging work and other branches of the metal industry. Represented by R. G. Haskins and Ralph Sloan.

HAUCK MFG. CO., Brooklyn, N. Y.—This company will exhibit water-cooled, open-hearth oil burners, high pressure air or steam oil burners, low pressure oil burners for heat treating, etc., flat flame oil burners, oil ladle heaters, oil torches and open-hearth equipment. Representatives will be F. A. Thomas, Herbert Vogelsang and Jules Escheman.

HAYNES STELLITE CO., New York—R. T. Cadwell, C. E. Chaney, A. Ruckstahl, H. M. Gregory, H. L. Ritts and F. E. Gardener.

HOMESTEAD VALVE MFG. CO., Homestead, Pa.—This company will display its line of equipment and will point out its application to the steel industry. Represented by B. F. Schuchman, H. P. Ackerman, C. E. Powell and Alex Elsaesser.

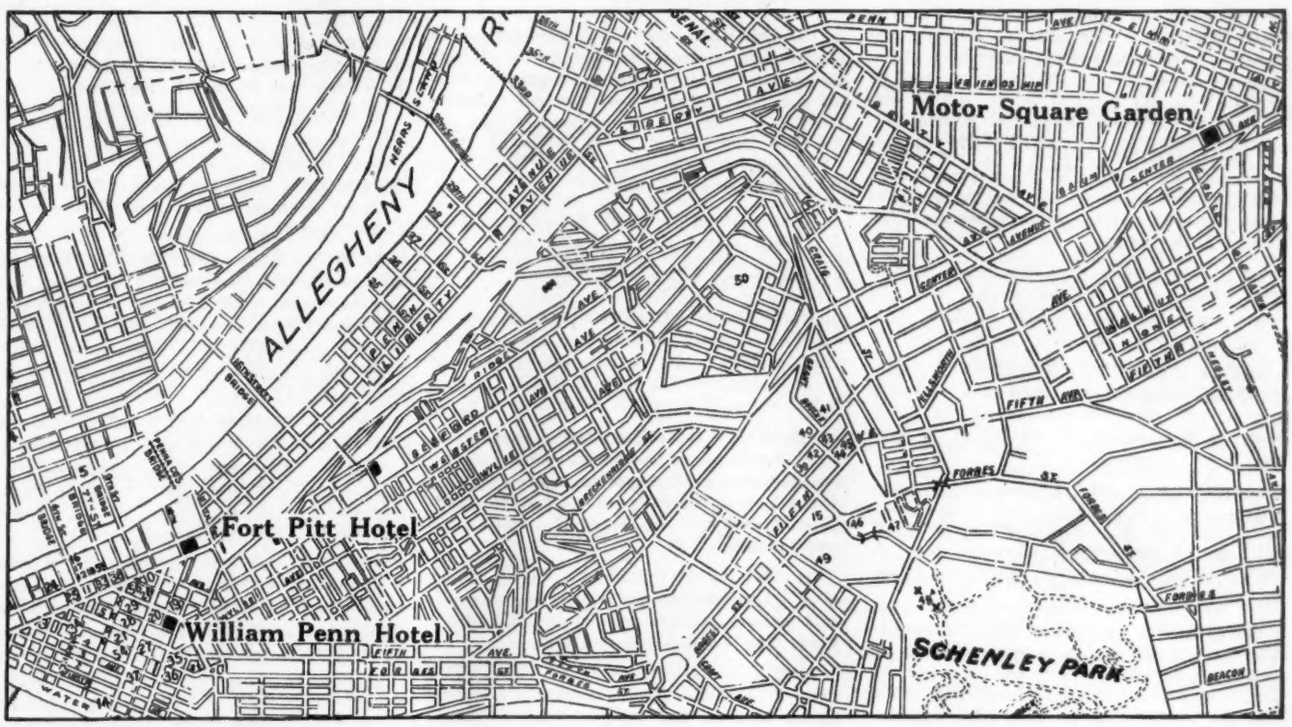
HOOVER STEEL BALL CO., Ann Arbor, Mich.—This company will exhibit samples of various types of balls produced, a display case showing the different stages of production of balls, and a gaging machine in operation, showing how the balls are graded. F. H. Lennox and H. G. Freeland will be the representatives.

HOSKINS MFG. CO., Detroit—This company will exhibit a special electric heat-treating furnace with automatic temperature control. Representatives in charge will be J. D. Sterling, and a motion picture film entitled "The Story of Alloy Steel" will be shown. W. J. McKenzie, Elmer Larned, Paul Llewellyn and George Fisher will be in charge.

IRON TRADE REVIEW, Cleveland—This booth will be fitted up as a rest room where all those in attendance at the convention are invited to make their headquarters. Represented by F. V. Cole, J. D. Pease, S. H. Jasper, J. R. Avey, C. J. Stark, E. L. Shaner, J. D. Knox, E. F. Ross, W. H. Lloyd and S. Frank.

JONES & LAUGHLIN STEEL CORP., Pittsburgh—Specimens illustrating the different products manufactured by the company will be exhibited. Jesse J. Shuman, H. W. Graham and A. Milne will attend.

KELLER MECHANICAL ENGINEERING CORP., Brooklyn, N. Y.—Demonstrations of an automatic die sinking machine, a cutter grinder



THIS MAP OF THE BUSINESS SECTION AND THE EAST SIDE OF PITTSBURGH SHOWS THE LOCATION OF THE WILLIAM PENN HOTEL, OFFICIAL CONVENTION HEADQUARTERS, AND MOTOR SQUARE GARDEN WHERE THE EXPOSITION IS TO BE HELD

Tool bits, welded tools, blades for milling cutters, boring bars and reamers, solid milling cutters, work rests for centerless grinders, dies, plug gages, fabric and rubber cutting knives, carpet cutting wires, linoleum mixing knives, castings for valves, optical reflectors, die casting machine parts and hot billet scrapers are to be exhibited by this company. A. B. Leonard and W. J. Lindner will be in charge of the booth.

HENDEY MACHINE CO., Torrington, Conn.—This company will exhibit a motor-driven milling cutter and a motor-driven lathe. The display will be in connection with the Laughlin-Barney Machinery Co. exhibit.

HEPPENSTALL FORGE & KNIFE CO., Pittsburgh—Forgings, shear knives, an impact testing machine and motion pictures will make up this exhibit which will be directed by I. E. Walton, G. I. Allen, F. C. Moyer, A. L. Wurster, R. C. Rose and C. J. Sauer.

HIGH SPEED HAMMER CO., Rochester, N. Y.—Various methods of riveting by high-speed hammers will be demonstrated by H. A. Moore, C. W. Schuchardt and H. C. LeVine.

HOLCROFT & CO., Detroit—Two small electric melting furnaces will be shown at the booth of the company. Representatives will be R. P. Ellis, W. D. Little, W. A. Gatward and C. S. Kinnison.

HOUGHTON, E. F., & CO., Philadelphia—A number of products will be shown, including carburizers, cutting oils, tempering and drawing oils, quenching oils, and leather belts and packings. Representatives will be H. G. Lloyd, G. W. Pressell, W. A. Buechner, D. J. Richards and C. H. Schultz.

HUNTER SAW & MACHINE CO., Pittsburgh—Saws, saw blades, grinders, sharpening and beveling machine, knives, clutch disks, valve plates, core plates, brick mold liners, pneumatic hammer rivet sets and chisel blanks will be shown.

HYBINETTE, VICTOR, Wilmington, Del.—Nickel tubing and drawn products will be shown.

INTERNATIONAL NICKEL CO., New York—Samples of nickel steel and nickel steel products for various industrial uses will be on display. Paul D. Merica, Charles McKnight Jr., Thomas H. Wickenden and L. Muller-Thym will attend.

INTERSTATE IRON & STEEL CO., Chicago—A display of steel parts and test samples and a flexible shaft bench grinder, with samples of work done by the machines will constitute this display. Represented by Jules Dierck, S. A. Keller, Robert Shaw, Charles Bitter, A. J. Benson and Henry Schreiber.

KING REFRACTORIES CO. INC., New York—High temperature cements for laying up fire brick settings, for veneering, patching, monolithic walls, rammed-in lining and insulating, will constitute this display. Represented by S. C. Smith, E. J. Eddy and H. J. Parthesius.

KINITE CO., Milwaukee—This company will exhibit various castings and dies, patterns from which these were made, and stampings made on the dies. Representatives will be T. A. Moormann, H. F. Kluender, William C. Eakin and E. J. Mohr.

KLEIST, CHARLES & SON, Jamestown, N. Y.—Drop hammer boards and drop hammer pins will be shown. H. E. Kleist will represent the company.

LAUGHLIN-BARNEY MACHINERY CO., Pittsburgh—The company will show machine tools built by the Hendey Machine Co., the Ohio Machine Tool Co., the Oliver Instrument

Co., the Avey Drilling Machine Co., the Oilgear Co. and the Foote-Burt Co. Detailed exhibits are listed under the names of the collaborating companies. Representatives of Laughlin-Barney Machinery Co. will be Harry Barney, John K. Henry, William Katzenmeyer, R. C. Niemeier, C. W. Pompey, and J. M. Hill.

LAVINO, E. J., & CO., Pittsburgh—This company will exhibit ferromanganese and refractory materials.

LEEDS & NORTHRUP CO., Philadelphia—A display of potentiometer pyrometers of the indicating, recording, signalling and controlling types, heat-treating equipment which will be in operation and actually hardening tools, will make up this exhibit. G. W. Tall Jr., A. E. Tarr, O. Brewer, H. Brewer and E. B. Estabrook will attend.

LEITZ, E., INC., New York—Workshop, mineralogical and Brinell microscopes and a metal microscope with camera, grinding and polishing machines, and an assortment of accessories of interest to steel concerns will be exhibited by this company which will be represented by G. S. Spindler and H. E. Bader.

LINDE AIR PRODUCTS CO., New York—Specimens and samples of oxyacetylene welded and cut steels, welding and cutting apparatus and equipment will be shown under the direction of R. A. Sully.

LUDLUM STEEL CO., Watervliet, N. Y.—This company will exhibit rustless and tool steels, under the supervision of P. A. E. Armstrong and V. S. Yarnell.

McCOY, BRANDT MACHINERY CO., Pittsburgh—Shapers and lathes will make up this exhibit and representatives will be R. A. Kelly, B. A. Getz, W. E. Brandt, H. J. Roth and J. W. Hemmerle.

MAHR MFG. CO., Minneapolis—A smoke model furnace, two calorizors and a blower will be on display. Representatives will be E. F. Piea, R. G. White, John H. Murrian, A. D. Fishel, H. A. Anderson, H. R. Rosendahl and W. M. Horner.

MATTHEWS, JAS. H., & CO., Pittsburgh—This exhibit will consist of steel stamping and embossing dies, steel letters and figures, marking machines and devices, brass and rubber dies for box printing, marking inks, identification checks and badges, metal shipping tags and bronze tags. Representatives will be Harry W. Ehrlen, J. L. McConaghy and H. R. Wade.

MIDVALE, CO., Nicetown, Philadelphia—Hardened and ground rolls for cold rolling various metals, stainless steel, eight stages in the manufacture of revolver chambers and a display of models showing the different style tools used in the Midvale shops for all sorts of rough and finished machining will make up this exhibit. H. E. Rowe, W. B. Smyth, J. C. Glass and J. E. DeCray will be in charge.

MOLYBDENUM CORP. OF AMERICA, Pittsburgh—This company will show some of the uses to which molybdenum is put in the iron and steel industry, together with commercial molybdenum ore and some ferromolybdenum. Representatives will be J. M. Fuller, Clifton Talyor, E. A. Lucas, J. W. Weitzenkorn and George Sargent.

MOTCH & MERRYWEATHER MACHINERY CO., Pittsburgh—This display will include various machine tools, including turret and tool room lathes, die cutting machines, grinders, millers, drills, shapers, presses and boring machines. Representatives will be E. C. Batcheler, J. T. McCuen, J. A. Menges, L. A. Rafferty, L. C. Deckard and J. L. Vance.

NATIONAL AUTOMATIC TOOL CO., Richmond, Ind.—Drilling machines, tapping machines, points, drill holders, tap holders and quick change holders will be exhibited by this company. Edward D. Frank, Ray Sterling and R. N. Piper will attend.

NATIONAL MACHINERY CO, Tiffin, O.—Work produced on machines manufactured by this company will be exhibited under the supervision of Charles Harmon, K. L. Ernst and F. J. Mawby.

NATIONAL TWIST DRILL & TOOL CO., Detroit—Twist drills, milling cutters and reamers will be exhibited. Harry Butler, J. McCaddie, C. Oxford and Messrs. Cornwall and Charles in charge.

NUTTALL, R. D., CO., Pittsburgh—This exhibit will comprise miscellaneous types of specially hardened gears together with several types of flexible couplings. Representatives will be W. H. Phillips, R. W. Young, L. H. Keim and W. H. Smith.

OBERMAYER, S., CO., Pittsburgh—This exhibit will comprise various grades of high temperature furnace cement, plastic fire brick for monolithic lining construction and a demonstration of the use of a prepared charcoal for loose pack rolling. E. D. Frohman, J. L. Cummings, W. C. Samuels, F. A. Eggert and F. P. Bullion will be present.

OHIO MACHINE TOOL CO., Kenton, O.—A 32-inch shaper equipped with motor drive will be exhibited. Represented by C. C. Swift and John Leibold.

OHIO STEEL FOUNDRY CO., Springfield, O.—This company will exhibit heat resisting alloy castings. Its representatives will be J. E. Galvin, F. G. Wright, T. H. Harvey, F. A. Fahrenwald and H. G. Shook.

OILGEAR CO., Milwaukee—A 6-ton gooseneck broaching and assembling press with automatic control will be placed in operation and driven by a 5-horsepower constant speed motor. Howard Crull and W. D. Creider will be the representatives.

OLIVER INSTRUMENT CO., Adrian, Mich.—This company will exhibit two automatic drill pointers and a die making machine. E. C. Oliver and W. G. Schutt in charge.

OLSEN, TINIUS, TESTING MACHINE CO., Philadelphia—This company will exhibit testing machines and equipment for conducting tensile, compression, transverse, ductility and Brinell tests. Extensometers, strain gages, and a static-dynamic balancing machine will be included. The company will be represented by T. Y. Olsen and R. B. Lewis.

PANGBORN CORP., Hagerstown, Md.—Barrel cabinet, and rotary table sand blast equipment will be shown in operation, together with displays of photographs illustrating sand blast installations, metallic abrasives, angular steel grit and steel shot, with data and information in regard to their use. John C. Pangborn, F. E. Wolf and H. D. Gates will attend the exposition.

PANNIER BROS. STAMP CO., Pittsburgh—A duplicate of the first known mechanical means of making a mark will be shown in connection with the company's display of marking methods employing steel stamps and dies. Representatives of the company will be O. M. Pannier, W. J. Pannier Jr., F. Speicher Jr., W. W. Hague and C. C. Gray.

PARK CHEMICAL CO., Detroit—This exhibit will consist of various hardening and heat treating materials including case hardening compounds, cyanides, reheating mixtures, lead pot covering, etc. N. H. Schermer and J. N. Bourg will attend.

PEERLESS MACHINE CO., Racine, Wis.—Motor-driven shaping and hack saws will be shown in operation. H. J. Swanson, A. H. Goetz and R. W. Hansen will be in charge of the exhibit.

PELS, HENRY, & CO., New York—This exhibit will consist of a billet shearing machine.

PENNSYLVANIA PUMP & COMPRESSOR CO., Easton, Pa.—An air compressor, direct driven by a synchronous motor will constitute this exhibit. This compressor will furnish compressed air for other exhibitors. Represented by R. H. Melick, C. A. Benckert and G. C. Towle.

PENTON PUBLISHING CO., Cleveland—Visitors are invited to make their headquarters at this booth which will be fitted up as a rest room. F. V. Cole, J. D. Pease, S. H. Jasper, J. R. Avey, C. J. Stark, E. L. Shaner, J. D. Knox, E. F. Ross, W. H. Lloyd and S. Frank will be the representatives.

PITTSBURGH CRUCIBLE STEEL CO. Pittsburgh—Finished and semifinished alloy and carbon steel products will constitute this exhibit. The company will be represented by O. L. Pringle and William I. McInerney.

PITTSBURGH INSTRUMENT & MACHINE CO., Pittsburgh—Brinell and impact testing machines, a sheet metal tester and a metallographic grinding machine will be exhibited under the supervision of Paul Kammerer and Charles Trueg.

QUIGLEY FURNACE SPECIALTIES CO., New York—This exhibit will comprise high-temperature insulation in brick, powder, blocks, and cement form and high-temperature cement for use in bonding and constructing furnace walls, etc. W. S. Quigley, W. H. Gaylord Jr., and D. F. McMahon will attend.

RACINE TOOL & MACHINE CO., Racine, Wis.—High-speed metal cutting machines, a combination wood and metal band saw, and a portable metal cutting machine will make up this exhibit. M. E. Erskine, D. B. Maxwell and R. E. Fuller will attend.

RANSOM MFG. CO., Oshkosh, Wis.—A tool grinding machine and a snagging grinding machine will be shown in connection with the Motch & Merryweather Machinery Co. display. G. P. Ransom will be the representative.

ROCKWELL, W. S., & CO., New York—Models of operating furnaces will be exhibited. J. N. Voltman and C. D. Barnhart will be in attendance.

RODMAN CHEMICAL CO., Verona, Pa.—This company will exhibit case hardening and carburizing compounds, luting compounds and quenching and tempering oils. Representatives will be Hugh Rodman and Gordon A. Webb.

ROESSLER & HASSLACHER CHEMICAL CO., New York—Products to be exhibited include various chemicals for case hardening and electroplating, and case hardened metal parts such as gears and pinions. Those in charge will be Charles H. Proctor and William M. Gager.

RYAN, F. J., & CO., Philadelphia—This exhibit will feature a demonstration of a new type oil and gas burner automatic control. There will be samples of various types of burners, with photographs of installations. A model will show a new type of sectional construction for the installation of high-temperature metal resistors in electric furnaces. F. J. Ryan, J. L. Edwards, Frank A. Hall and G. F. Beach will attend.

SCIENTIFIC MATERIALS CO., Pittsburgh—A Brinell machine, optical pyrometer, optical bench, grinding and polishing machines, and a solution for metallographic polishing will constitute this display. E. H. Fisher, E. C. Mateja and E. P. Dillinger will be in charge.

SHORE INSTRUMENT & MFG. CO.,

Jamaica, N. Y.—This exhibit will consist of a bulb type scleroscope, optical temperature indicators from 1200 to 3000 degrees Fahr., plasticity indicators, carburizing and hardening compounds, and fixtures for holding the work while testing. F. G. Kendall will be in charge of the booth.

SKYBRYTE CO., Cleveland—A window cleaning compound will be on display; represented by J. N. Gordon and F. W. Christman.

SPENCER TURBINE CO., Hartford, Conn. —A turbo compressor operating the oil and gas burning furnaces on display, and a smaller machine will make up the exhibit of this company. H. M. Grossman, C. D. Bushnell and O. J. Dingee will be present.

STEEL CITY TESTING LABORATORIES, Pittsburgh—The latest model Brinell machines will be shown; represented by H. A. Weaver.

SURFACE COMBUSTION CO., New York —This exhibit will include gas and oil burners and gas carburetors. F. J. Winder, M. Goodman and A. M. Apmann are to be the representatives.

SWEDISH CRUCIBLE STEEL CO., Detroit—Carburizing and annealing pots and boxes will be exhibited.

SWINDELL, WILLIAM, & BROS., Pittsburgh—This company will exhibit photographs and prints of melting and heat-treating furnace installations. It will be represented by E. H. Swindell, W. H. Cosgrove, F. W. Brooke, J. F. Baker and R. W. Porter.

TACONY STEEL CO., Philadelphia—Alloy bar steel, forgings, die blocks, piston rods and trimmer steel will be exhibited. Representatives will be H. A. Baxter and C. W. Forcier.

TATE-JONES & CO., Pittsburgh—This company will show automatic control units for oil and gas, various types of burners, and will give out electric furnace information. Representatives will be Edward Busch, W. H. Busch, R. L. Mann, W. M. Smith, P. J. Myall and J. L. Stroman.

TAYLOR INSTRUMENT CO.'S., Rochester, N. Y.—Portable and wall type indicators, recording thermometers and pressure gages, electric contact controls for core baking ovens, and molten metal, tempering bath and tinning pot thermometers will constitute this exhibit. The company will be represented by G. A. Howell, E. C. Taylor and E. A. Taylor.

UNION ELECTRIC STEEL CORP., Carnegie, Pa.—This company will have a display of die blocks, piston rods, rams and trimmer steel. W. L. Goodrich, Ross J. Emery, David Stuart, I. J. Johnson, W. H. Rieger and R. E. Lee will attend.

UNITED ALLOY STEEL CORP., Canton, O.—Sections of forgings and charts showing the physical properties of various heat treated alloy steels will constitute this display. H. H. Pleasance, W. H. Wiewel, M. H. Schmid, M. F. McOmber and F. W. Krebs will attend.

UNITED STATES CHAIN & FORGING CO., Pittsburgh—Specimens of various kinds of heat treated chain and moving pictures showing the comparative wear of treated and untreated chain, will make up this display. The company will be represented by Frank L. Campbell, Frank A. Bond and William H. Reid.

V & O PRESS CO., Hudson, N. Y.—A double length slide inclinable power press, a model of the company's press clutch, set of parts for a press, sample boards, photographs, etc., will constitute this exhibit. Edward Cairns and R. O. Brunst in charge.

VANADIUM-ALLOYS STEEL CO., Latrobe, Pa.—This exhibit will include such items as tools and products made by them, and fractures showing the result of different kinds of heat treatment and the effect of different methods of manufacture. Representatives will be W. S. Jones, J. P. Gill L. D. Bowman, E. L. Moberg, A. F. Chilcott, W. R. Mau, A. G. Henry, R. F. Noonan, W. L. Coller, F. W. Potts, J. H. Caler, R. L. Daull, T. J. Van de Motter, J. S. Cole, A. F. MacFarland, D. D. Dodd, D. A. Black, E. B. Kitfield, L. G. Murray, J. A. McKay, A. W. Stephenson, F. C. Comas, H. P. Edison, R. R. Artz and D. L. Bardes.

VANADIUM CORP. of AMERICA, New York—This company will show lantern slides of Peruvian scenes, mining and shipping vanadium ore, and applications of vanadium steel: Representatives George L. Norris, M. G. Baker, B. D. Saklatwalla, C. F. Fritz, J. A. Miller Jr., H. T. Chandler and W. R. Flannery will attend.

VULCAN CRUCIBLE STEEL CO., Aliquippa, Pa.—This company will have some information regarding present day uses of the better grades of tool steel. K. L. Kronfeld and A. D. Beekin Jr. will be in charge of the booth.

WARNER & SWASEY CO., Cleveland—A hollow hexagon turret lathe will be demonstrated. Representatives will be A. C. Cook, C. J. Stilwell, A. H. Keetch, J. E. Figner and E. Kunze.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa.—Four muffle furnaces with control features, one crucible furnace, one oven, two low temperature melting pots, one small combustion tube furnace, one small solder pot, two over heaters, one air heater and eight space heaters will be shown by this exhibition.

WILSON-MAEULEN CO., New York—Indicating and recording thermoelectric pyrometers and electrical resistance thermometers, and a hardness testing machine will be exhibited by this company. Represented by S. C. Horn, C. E. Hellenberg, Harvey Lee and William Printz.

WITHEROW STEEL CO., Pittsburgh—This exhibit will consist of ring gear blanks, front axleblanks, and rear axle shafts. W. P. Witherow, J. S. Langston and Lee Leibinger will attend.

The Dorchester Machine & Tool Works, Inc., Boston, has been petitioned in bankruptcy by three creditors, with claims totaling $18,880.

Meter Shows Composition of Stack Gases

The Bacharach Industrial Instrument Co., Pittsburgh, recently has introduced a CO indicator built on the same principal as the CO_2 meter which fills the need for an instrument to indicate the CO content. Diagrams of the new CO meter is shown in the accompanying illustration.

The operation of the meter is based on the catalytic action of a heated platinum wire in producing combustion of CO with oxygen. Referring to Fig. 1, *A* and *B* are two small platinum wires, each passing through the center of cylindrical chambers in two separate metal blocks. *B* is the comparison wire, and *A* is the measuring wire in the chamber through which the sample of flue gas passes slowly. The wires are heated to a temperature of about 800 degrees Fahr. by an electric current. Usually enough oxygen is present in the waste gases for the combustion of the CO and hydrogen but to make certain of this, air to the amount of 20 per cent of the gas volume is admitted through the small passage shown at *E* Fig. 2.

The catalytic action causes the CO and H_2 to burn along the surface of the wire *A*, thereby raising its temperature and increasing its resistance in almost exact proportion to the amount of these gases present. When considerable amounts of CO are present, the wire is heated to a brilliant glow. As *B* maintains constant temperature and resistance, the wheatstone bridge circuit, consisting of the wires *A* and *B* and the resistances *C* and *D*, becomes unbalanced, and causes an indication on the galvanometers *F* and

(*Concluded on Page* 974)

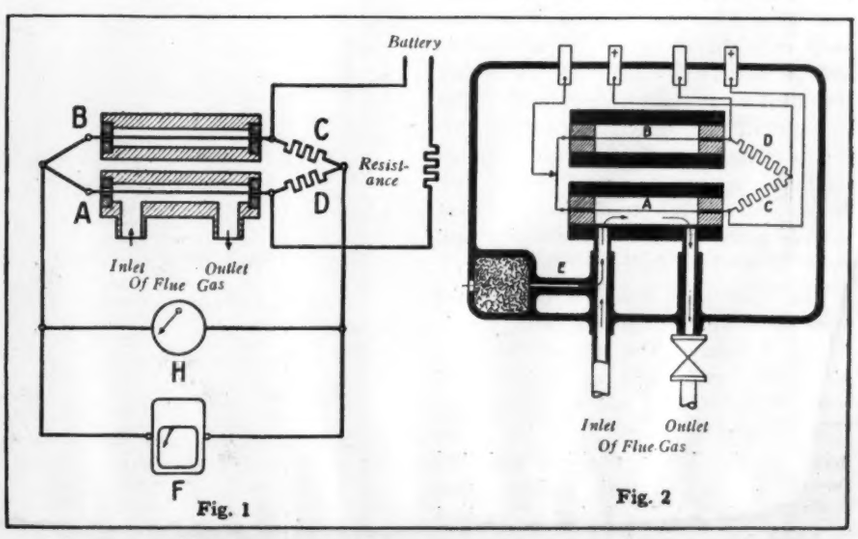


FIG. 1—WIRING DIAGRAM OF CO METER. FIG. 2—SECTIONAL DIAGRAM OF INSTRUMENT

TRUCK HAVING A LIFTING CAPACITY OF 4000 POUNDS

Designs Electric Lift Truck of Low Type

The Elwell-Parker Electric Co., Cleveland, recently has introduced a new electric haulage unit which may be used with the same platforms already employed with the hand lift truck. A view of the new power lift truck is shown in the accompanying illustration.

The new truck consists of a riveted steel frame equipped with an electric motor driving rubber tired wheels through a worm reduction running in oil. The frame is suspended on springs over this drive axle. Located immediately over the drive axle is an electric storage battery compartment for either the alkaline or lead type battery. The capacity of the battery carried in this compartment is sufficient under normal conditions to run the truck for a day. It is claimed the truck has sufficient driving power to carry a capacity load up a 10 per cent incline.

The front axle which is beneath the truck platform is equipped with wheels 5¾ x 4 inches. The top of the movable platform is built of ¼-inch steel plate 18 inches wide and 46 inches long. The platform clears the floor 6¼ inches when in the lower position and 9¾ inches in the elevated position, thus making a lift of 3½ inches. The load is lifted by means of an arm or screw ram attached to the rear of the rocking platform. The rocker arm allows the loaded skid to be moved slightly toward the operator, thus clearing any obstruction located beyond the load which might interfere with the elevation.

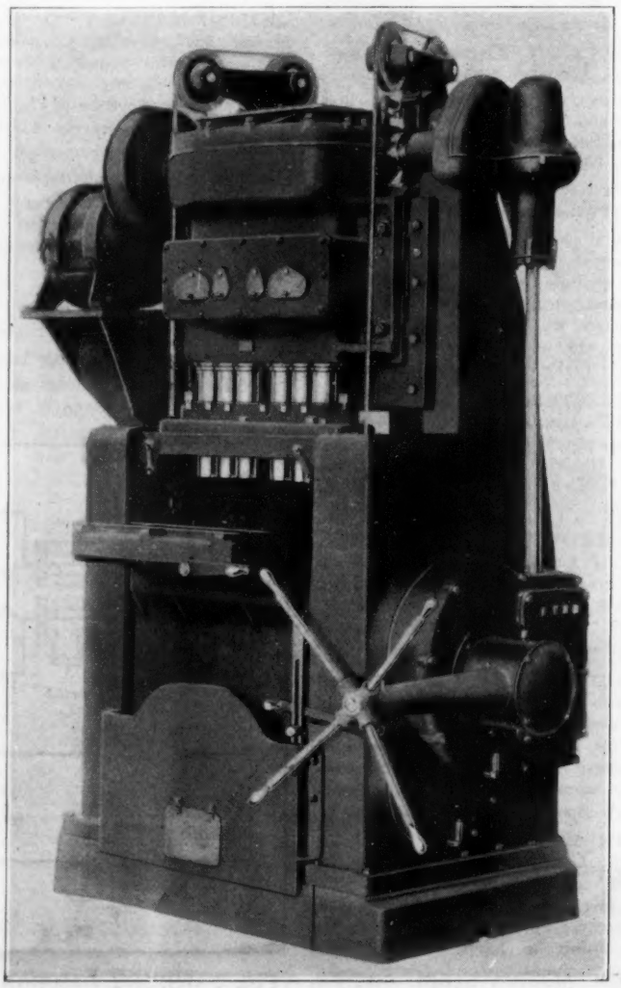
To pick up the load, the operator drives the narrow truck platform of his truck beneath the skid, closes an electric switch, the motor lifting the load 3½ inches in 10 seconds, stopping automatically when it has reached its full height. However, the platform may

All four wheels of this truck are steerable. The unit is intended primarily to extend the hand lift system, but may be extended by trailing a load on a hand truck. The truck will carry a 4000-pound load at a speed of from 300 to 400 feet per minute.

Machine Bores and Reams Automobile Cylinders

For use in boring and reaming automotive cylinders and for the performance of miscellaneous boring operations on other classes of work, the Foote-Burt Co., Cleveland, recently has developed a multiple spindle boring machine. A view of the new device is shown in the accompanying illustration. The new equipment is intended for use on production jobs where parts such as cylinders, sleeves, etc., are machined in quantity. For this reason the spindles are set at fixed centers and the speed and feed are worked out to meet the requirement of the particular job to be handled. In some cases users of this class of equipment have two or more boring operations which they wish to run on the same machine. To meet these requirements, the heads are made detachable and are bolted to the rail. This design allows a quick change of heads to be made. The interchangeability of the heads provides for using the same machine on new boring jobs that may come up from time to time.

These machines can be arranged for either belt or motor drive. In case of electric drive the motor is mounted on a bracket secured to the column. The necessary adjustments of speed to compensate for the variations in the hardness of the casting, etc., are obtained by regulating the speeds of the variable speed motor or shifting the belt on the pulley cone. From the motor the power is transmitted through reduction gears to a main driving shaft in the head. Two



BORING MACHINE FOR USE IN QUANTITY PRODUCTION

worms mounted on the main driving shaft transmit the motion to two worm wheels located near the top of the gear case.

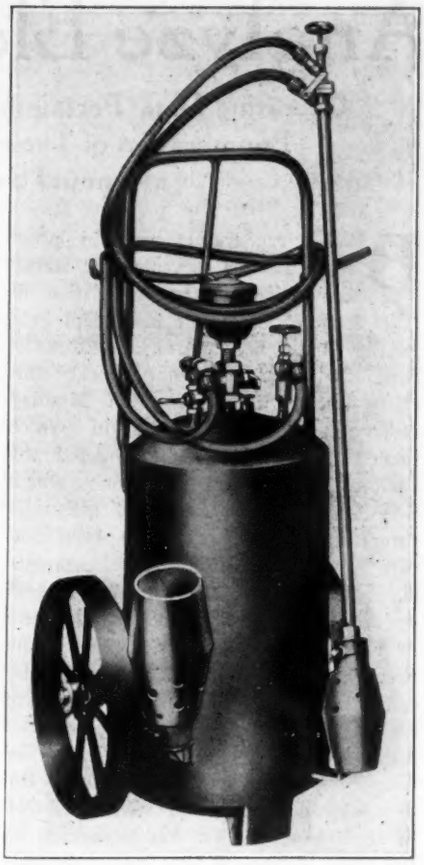
The following description applies to a six-spindle head, but a comparable arrangement is employed for other spindles. Each worm wheel is mounted at the top of the middle one of a group of three spindles, and under the worm wheel a spur gear is arranged which transmits power to spur gears mounted on the top of each of the other two spindles in the same group. These spur gears have their faces divided into two sections, the teeth on one of these sections being of a course pitch to carry the lead, the other section of the same gear furnishing the teeth of a finer pitch to divide the points of contact, thus providing a smooth running drive. The main driving shaft carrying the two worms is mounted on a roller bearing and is provided with a ball bearing to carry the end thrust of the worms. Each spindle is carried by an adjustable tapered bronze bearing.

The head of this machine occupies a fixed position and the feed is accomplished by raising the work table. Four feeds are provided by means of two sets of transposing gears mounted in a gear case. Power is taken from the main driving shaft in the head and carried through the spur and bevel gears to the vertical shaft at the lower end of which is a knockout worm meshing with the worm wheel. A spur gear on this worm wheel shaft meshes with a second gear carried on the shaft running transversally through the machine. This shaft carries pinions meshing with racks on either side of the table so that their rotation causes the table to carry the work to the work spindles. Raising the hand lever engages the knockout worm and makes the power feed operative.

A slotted bar is secured to the work table on which the feed trip may be set at any desired position. When the table reaches the end of the stroke the trip engages the bell crank lever and by rocking this lever causes the latch to release the hand lever. A spring then throws the worm gear out of engagement and stops the feed. Steel cables connected with the table carry counterweights which slide in cylindrical guards mounted on the back of the machine.

Introduces Oil Burning Torches and Forges

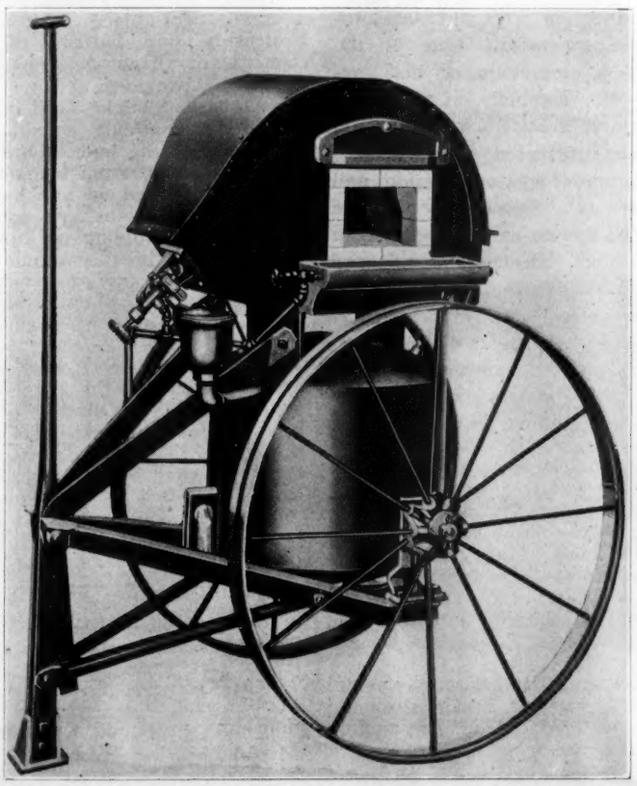
A new line of oil burning industrial heating apparatus has been introduced by the Johnston Mfg. Co., Minneapolis. Among the articles being placed on the market are rivet forges of the portable type designed especially for use in car repair shops, structural shops and boiler shops, oil burning torches and pressure blowers. Views of the rivet forge and the oil burning torch are shown in the accompanying illustrations.



TORCH BUILT FOR WORK IN CAR SHOPS

The features of the rivet forge are the heavy framework, the heavy lining, large wheels, etc. A new type of oil burner is used on this series of forges, on which the burner operates continuously without readjustment of the oil feed and without variation in the flame, using a fuel oil containing a large quantity of free carbon. This is accomplished by eliminating restrictions in the oil passage and by regulating the oil feed by an air valve. The entire floor of the heating chamber is visible to the operator so that he does not have to stoop to see the work. The capacity of the forge is limited by the operator's speed in charging and delivering the rivets. Capacity of the tank is 20 gallons and the height of the hearth is 38 inches. A light forge is also included in this series for use in car repair yards where easy and quick portability are required.

The oil burning torch is designed to burn either fuel oil or lighter oils. The large nozzle operates from a small flame 12 inches long to the large flame required for firing a locomotive boiler for a steam test. Principal uses for this machine are found in car repair work, firing locomotives for steam test and for starting fires in locomotives.



PORTABLE RIVET FORGE HAVING A SPECIALLY DESIGNED OIL BURNER

Analyze Electric Power Problems

Operating Data Pertaining to Steelworks' Auxiliary Equipment Together with an Enumeration of Their Claims and Limitations Arouse Considerable Interest at Annual Sessions of Iron and Steel Electrical Engineers

BRISK registration was in progress at the seventeenth annual convention of the Association of Iron & Steel Electrical Engineers held in the Broadway auditorium, Buffalo, Sept. 24 to 28. Mayor Schwab officially opened the convention Monday afternoon pressing a button which turned on the lights and started the various motors and machinery which was displayed by over 100 manufacturers in this country. A special feature of the exhibition was a complete electrified foundry showing the actual operation entailed in the manufacture of electric steel castings including the preparation of the mold, handling by crane, melting process, pouring of molds, cleaning and annealing of castings, etc. Twenty manufacturers of foundry equipment co-operated in the demonstration. A complete description of the steel foundry was presented in the Sept. 27 issue of IRON TRADE REVIEW, page 857.

A business session was held during the morning at Hotel Statler at which officers of the association were elected for the ensuing year. These, as announced in last week's issue of IRON TRADE REVIEW, include R. L. Shoemaker, Middletown, O., president; A. C. Cummins, Duquesne, Pa., first vice president; G. H. Shaeffer, Reading, Pa., second vice president; J. Farrington, Steubenville, O., treasurer; and J. F. Kelly, Pittsburgh, secretary.

R. B. Gerhardt Addresses Delegates

Convening in the session room of the auditorium the delegates were addressed by R. B. Gerhardt, Bethlehem Steel Co., Sparrows Point, Md., past president of the association, and by J. F. Kelly, Pittsburgh, secretary. The resignation of A. H. Schwartz, general manager of the association's expositions since their adoption, was accepted. The remainder of the first afternoon's session was devoted to committee reports. Each year it has been customary to present to the members of the association the electric developments that have occurred during the respective year. The report in this connection was presented by W. C. Kennedy, operating engineer, Worth Steel Co., Claymont, Del., and chairman of the committee. He cited the increase in the number of main drive applications and called attention to replaced steam engines, the extent to which gears are being used and the large number of motors that have the use of direct current exclusively on several adjustable speed applications. He pointed out that the rapid increase in the use of the electric drive may be due to the increment in the cost of coal and consequently steam, the increasing availability of reliable purchased power and the development in gear drive.

The speaker alluded to the Ford Motor Co.'s recent purchase of the largest alternating current and single-unit direct current motors for main roll operation in connection with its new steel plant, mentioning the fact that one of the motors is the first steelworks induction unit that will operate at a voltage exceeding 6600 volts. Attention also was directed to the first polyphase brush shifting alternating current motors which were installed this year at the plant of the Halcomb Steel Co., Syracuse, N. Y., for driving the main rolls of merchant mills. A closed system of generator ventilation also was cited as an important development in auxiliary equipment in connection with a 15,000-kilowatt turbine generator. One of the outstanding developments of 1923, according to Mr. Kennedy, is the auto-valve lightning arrester, a description of which was presented.

"Specifications for Construction and Installation of Automatic Engine Stops" to be known as "Association of Iron and Steel Electrical Engineers' Specifications" as recommended by the safety committee were presented by W. Greenwood, chairman of the committee and safety engineer, Carnegie Steel Co., Youngstown, O., In general, the specifications cover:

Automatic quick closing valves.

For steam pressure above 150 pounds extra heavy valves should be used. Preferably they should be of steel on account of shock, high pressure and high temperature.

A combination stop and throttle should not be employed where the steam line is over 3½ inches in diameter.

For condensing steam engines and for turbines, vacuum breakers should be used and operated in conjunction with the stop valve.

Valves should be of full working capacity to insure minimum pressure loss, at the same time should not be so large that leakage past clearances will operate engine without load at full speed.

Drawings showing full directions for installing and wiring should be furnished by the manufacturer.

So far as possible the use of fibrous packing, or packing composed wholly or in part of organic matter, should be avoided. Metallic packing should be used wherever practicable.

Stems that must be packed to prevent leakage of steam, preferably should extend in or above a horizontal line.

Where an automatic valve is constructed with a by-pass for equalizing pressure on both sides in order to reset it, the valve in the by-pass should be of such make that it cannot remain in the position that would prevent the main valve from operating after the attendant had released his hold on the by-pass valve.

Electrical Equipment

Current. Where high tension direct current, 110 to 220 volts, is available, current should be supplied by generators in addition to current furnished by storage batteries. The batteries should be of sufficient capacity to deliver necessary current during the interruption of main source of supply for any period that is likely to occur. The number of cells should be so proportioned to the resistance that they will float on the line when fully charged. Battery should be placed in a clean cool place easy of access. Preferably one battery of sufficient capacity for all engine stops in a plant should be provided.

Switches. Switches and contacts for opening the circuit should break on both sides of the line, in order to prevent the current from being maintained through a ground on one line. Where engines or turbines are connected to generators, a holding or knockout coil on the circuit breaker should be placed in series with the stop circuit, or a separate circuit should be provided to trip the breaker when the automatic stop operates.

Stop stations. Switches at stop stations must be of the type for manual operation. They should be enclosed in dust proof cases having glass in the covers that can be broken to operate the switch. The cover should be supplied with a lock so that the case cannot be opened unless for the purpose of renewing glass, or for making tests without breaking the glass.

A. C. Cummins, first vice president of the association and electrical superintendent, Carnegie Steel Co., Duquesne, Pa., presided at the opening session Tuesday morning at which time was presented the report of the special bearing committee. D. M. Petty, chairman of the committee and electrical superintendent, Bethlehem Steel Co., South Bethlehem, Pa., out-

lined what has been accomplished by the committee after a years' careful study of the problem of applying roller and ball bearings to motors. He enumerated several causes of bearing failures and presented a resume of a joint meeting with a committee representing the Power club. The conclusions drawn at this joint meeting follow:

1. It is desirable to standardize bearings as quickly as possible so that motor users may install roller or ball bearings in existing motors and use sizes which will line up with standards to be used by motor builders in the future.
2. It was considered desirable and practical to standardize on ball-bearing sizes that will be interchangeable with roller-bearing sizes so far as outside and inside diameter is concerned. Roller bearings in this discussion being limited to the solid roller type, it was pointed out that while a roller bearing and ball bearing of the same inside and outside dimensions would be interchangeable from a mounting standpoint, the roller bearing would almost invariably be capable of carrying a somewhat heavier load.
3. After a general discussion it was considered advisable to adopt the standard ball-bearing sizes of the 300 series, and that the roller bearings be made to conform to these sizes so far as inside and outside dimensions are concerned.
4. That the number of standard sizes for motors be limited. to the smallest practical number so as to reduce the number of spare bearings necessary to stock or protection against breakdowns.
5. That no attempt be made to standardize on any particular size of bearing for a given frame size of motor of any given horsepower rating or speed; that the selection of the sizes for any line of motor be left in the hands of the designing engineers.

A tentative list of bearing sizes that will take care of motors up to about 150 horsepower was presented by the committee but action on its adoption is to be delayed for a month, as was brought out in later discussion, the committee being of the opinion that the best course to pursue is to adopt a small number of sizes and add to it. In discussing this report E. S. Jeffries, Steel Company of Canada, pointed out that the largest source of operating difficulty in connection with motors fitted with roller bearings is brought about by grease and oil leaking from the bearings into the windings, and that his company is advocating an antifriction type bearing. Discussion of the paper was closed by Mr. Petty who stated that while it is difficult to fit bearings into all kinds of motors, new motors could be designed to accommodate a bearing of the desired size. The speaker was of the opinion that a definite decision could be reached in connection with minimizing bearing sizes by meeting with bearing and motor manufacturers.

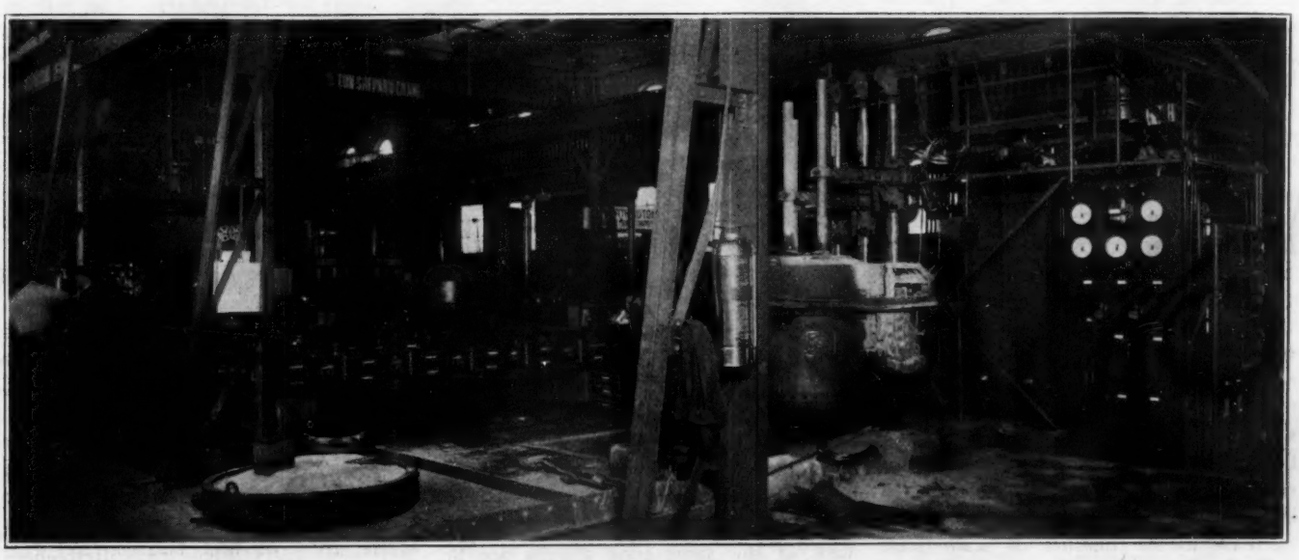
In speaking on "Motor Operated Centrifugal Pumps in Steel Plants," B. A. Cornwell, electrical engineer, Carnegie Steel Co., Youngstown, O., made it plain that one of the most important factors in maintaining and increasing production is the efficiency and the reliability of the water supply system. He described a pump of the centrifugal type and presented characteristic curves depicting the performance and operation of typical centrifugal pumps as used in steel plants. After comparing the cost of a motor-driven pump with a steam-driven turbine, the speaker directed attention to the fact that the large majority of pump installations make use of an alternating current motor and emphasized that the choice of the type of motor depends upon the starting conditions and the capacity of the generating station supplying the power.

E. S. Jeffries, Steel Company of Canada, presided over the Tuesday afternoon session. A paper entitled "Single Bucket Blast Furnace Skip Hoist Characteristics" and prepared by A. C. Cummins, electrical superintendent and A. R. Leavitt, electrical engineering department, Carnegie Steel Co., Duquesne, Pa., was presented by the former. He called attention to the principle features claimed for each type of motor equipment and presented data secured while checking over the actual performance of a number of hoists to corroborate the various points of superiority which each type is said to possess. Since incline designs on the performance of hoists is of utmost importance, this point was discussed at length. Another feature which affects the performance of the hoist, in Mr. Cummins opinion, is the design of the bucket filling and dumping apparatus as was shown by a series of time studies.

Discussion of Messrs. Cummins and Leavitt's paper was opened by F. Kitridge, Joliet works, Illinois Steel Co. who pointed out that skips are operated

Operate Complete Foundry Unit at Show

A MODEL foundry unit, comprising an electric furnace, sand preparing apparatus, molding machines and flask equipment, sand blast machinery, etc., was operated during the convention. It is believed this is the first time an attempt of this kind has been successful on the floor of a national exposition. As explained in detail in last week's issue, the equipment of the foundry was supplied by a score of manufacturers. E. P. Langworthy, manager of the foundry, J. H. Scully in charge of molding, and seven foundry workers—all from the Buffalo steel foundry of the American Radiator Co.—operated the equipment.



ONE CORNER OF THE HALL WAS DEVOTED TO A SMALL FOUNDRY COMPLETE WITH MELTING, MOLDING, HANDLING, ANNEALING AND FINISHING EQUIPMENT

successfully by two 75-horsepower motors, automatically controlled and fitted with hand control so that in case one motor fails the other will function through hand control. F. Cramer, Bethlehem Steel Co., Johnstown, Pa., in the course of his discussion of the paper advocated the standard compound wound mill type motor for operating skips. F. Wiley, Wisconsin Steel Co. stated that one advantage of employing a double motor for skip elevation is the ease in which blast furnaces so equipped are kept in operation.

Common and special hazards resulting from traverse operation of ore bridges were pointed out and a system of control designed to afford protection against such hazards were described in a paper submitted by P. R. Canney, electrical engineer, Minnesota Steel Co., Duluth, Minn. The paper was presented by D. C. Wright, Electric Controller & Mfg. Co., Cleveland. Wind thrust on a large bridge in a severe wind storm, according to the author, may amount to considerably over 100 tons.

The greatest single source of danger to a bridge either in motion or stationary, is due to high winds, although other dangers include track conditions, failure or breakage of mechanical details, mistaken or carelessness of operation and unsuitable or deficient control equipment. To secure protection as far as possible against the operator's carelessness as well as the other dangers enumerated, a series of controls have been developed by C. O. Burton assistant electrical engineer, Minnesota Steel Co. This control was explained in detail by Mr. Burton in an article in the April 12, 1923 issue of IRON TRADE REVIEW.

In discussing Mr. Canney's paper, R. E. Brown, Heyl & Patterson, Inc., Pittsburgh, stated that the repair of wrecked bridges does not entail more than 50 per cent of the original cost. He described various types of clamps for rails including the self-locking cam and toggle link types and questioned the safety of applying clamps while the bridge is in motion. Gordon Fox, Freyn, Brassert & Co., Chicago, pointed out that bridge apparatus should be well maintained so that it will function under ordinary conditions. J. Farrington, Wheeling Steel Corp., Steubenville, O., advocated the use of compressed air in setting brakes on ore bridges. T. Eastwood, Cutler-Hammer Mfg. Co., Milwaukee, in speaking of a recent development in the mechanical arrangement for moving ore bridges stated that a worm gear of the self-locking type drives a spur gear, which in turn engages with a rack so that the bridge is geared to the road. By this arrangement the use of track clamps is obviated.

W. S. Hall, Illinois Steel Co., Chicago, presided over the session of the third morning introducing L. W. Egan, special engineer, Ohio Steel Foundry Co., Lima, O., who spoke on "The Complete Electrification of the Foundry Industry." The speaker outlined the possibilities of electrified methods and systems as apply to the process of molding and discussed the effect of electrification on the increase of production, the speeding up of the work and the stabilizing of the maintenance situation in general. He directed attention to two outstanding features in the electrification of machine molding, namely, the rollover, jolt pattern draw machine and the sand slinger. Mr. Egan in speaking on core heating asserted that the electrically-heated oven is coming into more general use not only because of the vast improvement in the quality of the cores, but where the cores are irregular in shape, and of the smaller variety, it can be accomplished cheaper and faster. He pointed out, however, that the electric oven is not a cure for all core baking troubles.

Traces Development of Molding

Discussion of Mr. Egan's paper was opened by E. S. Carmen, chief engineer, the Osborne Mfg. Co., Cleveland and past president of the American Society of Mechanical Engineers, who traced the development of the jar-ramming mold during the past 10 years. He maintained that foundries appear to be drawing away from the idea of jarring by electrical means but look with favor upon electric current for turning over the mold and withdrawing the pattern. Continuing, he stated that jolting the mold is accomplished best by compressed air but that rolling over and handling the mold is cheaper when performed electrically than by compressed air.

Fuels usually employed in the heating of core ovens including coke, oil, gas and electric current were outlined and compared on a cost basis by F. A. Coleman, president, the F. A. Coleman Co., Cleveland. He directed attention to the increased use of current stating electricity is most universal in its location and that of the four fuels enumerated the cost of current is the most likely to head downward. After emphasizing the fact that control is most vital in the operation of core ovens and citing the importance of the thermostat as the guardian over the electric oven, Mr. Coleman concluded his remarks by distinguishing the advantages of drawer and rack-type core ovens. In the opinion of P. H. McShane, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., not enough consideration is given to the purchase of equipment used in the foundry and controlled by motors. Discussion of Mr. Egan's paper was concluded by J. H. Shepard, Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. who stressed the importance of choosing the correct type of current for the foundry and alluded to the danger of overloading cranes.

At the opening of the afternoon session G. H. Shaeffer, Carpenter Steel Co., Reading, Pa., presided. In speaking on "Electric Furnace Phenomena" E. T. Moore, electrical engineer, Halcomb Steel Co., Syracuse, N. Y., and consulting engineer, Crucible Steel Co. of America, N. Y., outlined the details of an elaborate test conducted at the plant of the former company's works on a 6-ton heroult-type furnace. The impression in some quarters that the arcs in an electric furnace stay in certain restricted positions around the periphery of the electrodes and with reference to each other was disproved by photographs taken in conjunction with the test which clearly indicates a variation in the position of the arc around the bottom end surface of the electrode. The paper was widely discussed.

Comparative points in a few of the various types of liquid rheostats that have been designed and placed in service were brought out by D. M. Petty, electrical superintendent, Bethlehem Steel Co. South Bethlehem, Pa. in a paper entitled "The Liquid Slip Regulator or Rheostat." During his discourse Mr. Petty described a type of rheostat which has a separate pot for each electrode.

G. R. McDermott, Illinois Steel Co., Chicago, occupied the chair for the session on Thursday Sept. 27. H. C. Siebert, combustion engineer, Bethlehem Steel Co., South Bethlehem, Pa., in presenting a paper on "Economical Use of Fuel in the Steel Plant" pointed out the rate at which the country is drawing on its store of bituminous coal and how that fuel is distributed among different consumers in this country. The rate of consumption for a good business year was placed at 550 million short tons. The speaker cited that the steel industry including steel plants, and beehive and by-product coke ovens consumed 21.6 per cent of all bituminous coal mined in this country; railroads 28 per cent; domestic consumers 10 per cent; and industries other than steel and coke 25 per cent.

Mr. Siebert compared the loss entailed in the production of coke by the two methods and asserted that the gases wasted at beehive ovens in this country for a year would be sufficient to melt 21 million tons of steel. Lantern slides were submitted showing the effect of stove and boiler efficiency on the amount of steam that can be generated by the use of blast furnace gas. He showed by data in the form of heat balances and fuel rates for principal primary and auxiliary

fuel consuming equipment now employed in steelworks how a saving may be realized without undue difficulty and in doing so considered coke ovens, blast furnaces, and their auxiliary equipment, open hearths, gas producers, heating furnaces, steam boilers, steam engines and gas engines. He declared that an economy of 10 per cent in fuel consuming equipment will net a saving in coal of 10 million tons per year.

In discussing Mr. Siebert's paper G. R. McDermott stated that his company has been using blast furnace gas and tar on open-hearth furnaces, about 60 per cent of the gas to the furnace being blast furnace gas; for blowing gas producers, blowing alternately with blast furnace gas and air; and on plate mill heating furnaces. R. B. Gerhardt, Bethlehem Steel Co., Sparrows Point, Md., pointed out that since the 10-hour day now is established at a number of rolling mills in this country it might be well to consider the casting of blast furnaces during the idle turn in order to conserve as much blast furnace gas as possible.

A paper was read by T. A. Marsh on "Tempering of Coal." From investigations conducted by the author it was found that moisture can be added to some coals to definite advantage especially to western bituminous coals. He pointed out that coke braize, anthracite and dock screenings burn better when dampened slightly to prevent siftings and blowing of fuel bed. He found that the effects of moistening are more pronounced on traveling grate stokers so far as combustion results are concerned and that the advantages obtained from tempering coal more than offset the decrease in value.

Thursday afternoon's session was opened by Dr. D. S. Jacobus, advisory engineer, Babcock & Wilcox Co., New York, who outlined what has been accomplished in building a boiler which would operate at high pressure. He stated that boilers now are being constructed for 1200-pound working pressure with wrought steel economizers for power plant service presenting a detail drawing and describing the high-pressure unit. He stated the working pressure will be supplied with individual steam turbines and that it is the idea to eventually generate all of the steam for a power plant with high-pressure units of the sort and after passing the steam through several of the high-pressure steam turbines to pass the exhaust steam from the high-pressure steam turbines to a main steam turbine. Should the latter be operated at a lower pressure than 300 pounds and at a lower temperature than 725 degrees Fahr., the gain through using the high pressure would be increased and might reach 30 per cent or more.

Discuss Boiler Problems

C. J. Smith's paper on "Boiler Troubles from the Operating Man's Standpoint" was submitted by W. P. Chandler Jr., steam engineer, Carnegie Steel Co., Duquesne, Pa., in the absence of the author. In discussing this topic the author included leaky boiler settings, leaky baffles, soot and ash accumulation, slow ignition, refractories, feed water, and feed water regulators. He pointed out that a careful analysis of all the troubles of steel mill boiler plants will show that 90 per cent of the difficulties are maintenance rather than operating troubles.

W. M. Hepburn, vice president, Surface Combustion Co., New York read a paper on "Surface Combustion and its Application." He stated that increasing the temperatures of combustion does not necessary mean an increase in the flue gas temperature; in reality, he continued, there is a reduction in the heat carried off by the flue gases for the reason that the economy effected in the rapid heat transfer at the higher temperatures causes less gas to be used.

During the evening a banquet was held in the ball room of the new Statler hotel which was largely attended by the visiting delegates. At the final session held Friday morning Sept. 28 P. T. Vanderwaart, electrical engineer, New Jersey Zinc Co., Palmerton, Pa., presented a method for "Systematizing the Work of an Electrical Engineering Department." Various forms including those for plans and lists of material for construction, job progress sheet, system diagram, feeder change record, feeder load record, graphic charts, motor load record, and department motor record sheets, were submitted and explained in detail. Selection of locomotives, motors, control and collector systems was outlined by F. O. Schnure, electrical engineer, Bethlehem Steel Co., Sparrows Point, Md. in his paper entitled "Electric Transportation." He mentioned that about 1900 feet of underhung, bottom contact, third rail system has been in service at his company's plant since May and presented details of construction and operating data. The largest saving which is not brought out in the fuel ratio, said Mr. Schnure, is the entire absence of standby losses in maintaining a steam pressure to serve the open hearth as the steel was required. Delegates attending the convention numbered in excess of 850.

Air Electric Brass Furnace Problems

THAT the nonferrous field is thoroughly awake to the possibilities of electrical melting and is keenly interested in this development is attested by the attendance of over 75 at a round table session of the American Electrochemical society held in Dayton, O., Thursday noon, Sept. 27, and dedicated to a free discussion of electric brass furnace practice. Dr. H. W. Gillett, United States bureau of mines, Ithaca, N. Y., presided and under his direction the intimate operating details of electrical brass melting furnaces were presented and discussed by engineers, metallurgists, furnace designers and builders, refractory experts, operating men and power company representatives.

Power rates in various localities, the first subject presented by the chairman elicited a statement from C. F. Hirshfield, Detroit Edison Co., Detroit, offered as an individual and not as the opinion of his company, that if the need arises, public service corporations should stand ready to furnish power to brass foundries at a price which will enable them to compete on a fair basis with other firms, perhaps more fortunately situated with reference to power costs. In other words, power rates should be considered in the same light as freight rates and the community in which a brass foundry is located should, if necessary assume a share of the burden of costs to enable a local manufacturer of castings to work on a competitive basis with rival companies.

Questions by the chairman elicited the information that the following rates are available for brass furnace service in the localities mentioned:

City	Rate per kilowatt hour (Average, cents)
Dayton, O.	1½
Cincinnati	1¼ to 2¼
Bridgeport, Conn.	1.38
Mansfield, O.	1¾ to 2
Erie, Pa.	1¾ to 1.9
New York state	1½ to 2
Buffalo	0.9 to 1.1
Chicago	3 for first 3000 kilowatts 1.1 next 20,000 0.9 nex 70,000

With current at 2 cents and oil at 6 cents, one foundryman gave costs of $22.99 per ton for electric melting and $20.68 for oil. He stated a preference for the electric method due to the superior quality of metal his practice gave with the electric unit.

For continuous operation on rolling mill materials of less than 75 per cent copper

the induction type electric furnace was recommended by Walter R. Clark, Bridgeport Brass Mfg. Co., Bridgeport, Conn. Mr. Clark stressed the unreliability of refractories under service in this type furnace. He stated that linings, particularly the rammed-in types failed through shrinkage cracks or through softening of the cement at high temperatures. John A. Seede, General Electric Co., Schenectady, N. Y., reported as an exceptional performance a production of 800,000 pounds of 95 per cent copper alloy in an induction type furnace with a lining of which fire clay was used as a base. No clear understanding is yet had of the differences in conditions which allowed the exceptional life. He stated that magnesite also had been tried.

H. B. Swan, Cadillac Motor Car Co., Detroit, stated that with an arc-type furnace melting 85 per cent copper borings after the first 600 heats the lining looked good for hundreds more. It was stated that none of these furnaces in one size has ever been shut down short of 1500 heats. Cases of 2000 heats in one ton furnaces were cited. N. K. B. Patch, Lumen Bearing Co., Buffalo described an aluminum oxide hearth in a resistance type furnace that gave from 1½ to 2 million pounds production. This was formed by ramming in a ground firebrick base mixed with corundite clay and fusing it with aluminum borings.

Summarizes Results of Discussion

In summing the results of the discussion of suitable refractories, G. W. Bole, United States bureau of mines, Columbus, O., stated that the linings mentioned by trade names or chemical constituents had ranged from highly acid substances through the neutral to the basic materials. He pointed to the need for investigation on an unprejudiced basis, and predicated upon kinds of materials used. He said that the ideal lining would be one which could be sintered in place in a number of superimposed layers, to obviate the difficulty due to the different expansion factors, and to the fact that shrinkage cracks develop more readily in a hard vitrified surface inadequately supported due to the softer backing material. This recommendation, it was stated, could not be followed in the induction type furnace.

W. M. Corse, representing the National Research council urged that the society seek the co-operation of other technical bodies such as the American Ceramic society on the subject of refractory research. G. K. Elliot, Lunkenheimer Co., Cincinnati, chairman of the electrothermic division indicated his intention to suggest this action.

The subject of suitable crucibles was introduced by Dr. E. F. Northrup, Ajax Electrothermic Corp., Trenton, who described a high frequency induction furnace using a crucible of graphite or other high conductivity material as a resistor. This crucible is packed in an insulating substance. The crucible holds 150 pounds, and as the furnace requires no water cooling connections it may be lifted off its base and carried to any desired point for direct pouring.

The discussion was scheduled to end at 3 o'clock to permit those present to visit McCook field as guests of the local committee, but the interest was so great that by vote of those present, the session was prolonged to 5 o'clock.

Many See Exhibits of Machine Tools

WITH 140 exhibitors and 15,000 visitors to its credit this year, the annual machine tool show at Mason laboratory, New Haven, Conn., bids fair to become an important annual event in the tool industry of the country. The exhibit is unique in that it is held on the campus of a university, is designed partly for the education of undergraduates and is therefore a connecting link between industry and school. Manufacturers realizing that the students of today are the customers of tomorrow are taking increasing interest.

It is human nature for a majority of those visiting an exhibition such as that at New Haven to pass quickly by the long arrays of unmoving, unconnected machines and machine parts, and seek the exhibits which have life. This is not due entirely to curiosity or to the desire to be entertained. The trained executive wants a new tool development translated for him in terms of work produced.

The tool exhibit which will best "get across" to the largest number of tool users is the one showing machines in actual operation on a practical job.

A good example of this was seen at the booth of the National Acme Co. where a Gridley-type multiple spindle screw machine continuously produced completely machined bicycle hubs. Other good examples were afforded in booths where the Bullard Machine Tool Co. automatic boring mill turned out complete cam gears for Paige cars, the Keller Mechanical Engineering Corp.'s die sinker automatically produced dies, the Jones & Lamson Machine Co.'s new turret lathe took heavy cuts in steel, and the Warner & Swasey Co.'s turret lathe was in operation.

Demonstrates Belt Shifter

The Sipp Machine Co. displayed one of the most interesting devices at the exhibition. This was a combined belt shifter and belt tightener for use on the standard type of speed changing belt pulleys for lathes, drills, and other light tools. By this device the drive belt of a small vertical drill which was in operation was changed from one diameter pulley to another at will by merely turning a handle in front of the operator. This was accomplished something as follows. The belt which was of a length to give considerable slack was held tight by an idler. The belt changer was moved up and down by a flat worm gear, its movement being so co-ordinated with the operation of the tightener that in operation the belt was first loosened, then shifted, and then tightened again.

Among other exhibits which attracted attention was that of the Reed-Prentice Co., showing geared-head lathes in operation; a line of portable electric drills by the A. F. Way Co.; a blue print machine shown by Wickes Bros. and a screw thread comparator demonstrated by the Jones & Lamson Co. Several surface grinders were displayed and many floor and bench grinders but only one internal grinder was noticed. This was in the exhibit of the Rivett Lathe & Grinder Co. which concern, in conjunction with Purington & Smith, displayed its precision lathe. Pratt & Whitney Co. dispayed four or five machine tools and an automatic centering machine.

An interesting novelty with marked advertising value was seen at the New Departure Mfg. Co. booth. Here steel balls dropped from an opening at one side of the display, bounced off a steel block, through a suspended loop, down onto another steel block, and then almost at right angles through an opening in the screen at the back of the exhibit. Progress in many directions has been made over the show of last year, and with larger quarters next year the exhibition should be representative of national machine tool progress. J. D. Morris was superintendent of the exhibit, which was held under the combined auspices of the Yale university, the New Haven section of the American Society of Mechanical Engineers, and the New Haven chamber of commerce.

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields

CHARLES M. BROWN, who has been elected president of the Colonial Steel Co., Pittsburgh, and Monaca, Pa., to succeed D. W. Dunlevy, has for the past seven or eight years been vice president in charge of sales. Prior to that he was secretary and sales manager of the company. Mr. Brown was born in Pittsburgh, Oct. 16, 1870, and was graduated from Yale university with an A.B. degree in 1891. His initial business experience was with Howe-Brown & Co., Ltd., Pittsburgh, which succeeded Hussey-Wells & Co., the first company in the United States to make tool steel. He remained with Howe-Brown & Co., until 1901. He then became identified with the sales department of the Crucible Steel Co., of America, remaining about a year, when he was appointed secretary and sales manager of the Colonial Steel Co. Since that time his rise has been rapid.

Mr. Brown also is a director of the Pennsylvania Trust Co., and trustee for the Dollar Savings bank. He is a member of the American Iron and Steel institute and the American Society of Mining Engineers and of the University club and Pittsburgh Golf club, Pittsburgh.

Herbert C. Poole, previously in charge of the New York office of the Colonial Steel Co., has been made works manager at Monaca, Pa., and Jacob Trautman Jr., formerly assistant general sales manager, has been promoted to general sales manager.

E. I. Hunt, formerly foundry superintendent of the Fox Machine Co., Jackson, Mich., has been made foundry manager of the Jackson Furnace & Foundry Co., that city.

Edward J. Weil, recently appointed sales manager of the Cadillac Motor Car Co. of Canada, Ltd., Oshawa, Ont., previously was a foreman, superintendent and then sales manager of that company.

H. B. Lindsay, sales manager of Norton Co., Worcester, Mass., severed his connection with that company Oct. 1 to engage in another line of business in Connecticut.

Bruce Wallace will represent the Vitrified Wheel Co., Westfield, Mass. in Cleveland, starting Oct. 1. Mr. Wallace has been active in the abrasive field for several years.

Palmer E. Hanson has been made superintendent of the Cream City Foundry Co., Milwaukee. Mr. Hanson formerly was superintendent of one of the foundries of the Lakey Foundry & Machine Co., Muskegon, Mich.

CHARLES M. BROWN

Percy W. Brown of Hornblower & Weeks, broker, New York, has been elected a director of the United Alloy Steel Corp. to succeed James A. Fayne, resigned.

George Gordon Crawford, president of the Tennesse Coal, Iron & Railroad Co. has been appointed chairman of the state dock commission of Alabama, which board will be in charge of the port of Mobile development, Alabama's only seaport. The appointment was made by Governor W. W. Brandon.

W. E. Sykes, of the Power Plant Co., Ltd., West Drayton, England, has severed his connection with that company and has left for the United States where he will join the staff of the Farrel Foundry & Machine Co., Inc., Buffalo, N. Y., as consulting engineer. Mr. Sykes has designed power transmission for all types of duty and has made a specialty of heavy rolling mill work and stationary and marine turbine drivers. He spent seven months in this country last winter familiarizing himself with American business and engineering practice.

D. H. McDougall has resigned as vice president of the British Empire Steel Corp., Montreal, Que., but remains a director of the corporation. He had been associated with subsidiaries of that company for 20 years, one of which, the Nova Scotia Steel & Coal Co., he was president of when he resigned. G. F. Downs, formerly president of the Lackawanna Steel Co., has been elected a director and a member of the executive committee of the British Empire corporation.

A. H. Chamberlain, formerly secretary-treasurer of the American Iron, Steel & Heavy Hardware association with headquarters in New York, has resigned from that office to become associated with Edgar T. Ward's Sons Co., of Boston, Detroit, Philadelphia, Cleveland, Chicago and Newark, N. J., as general manager of sales. George F. Greene, for several years assistant credit manager of the Midvale Steel & Ordnance Co. assumed the office vacated by Mr. Chamberlain as of Oct. 1.

George B Mitchell, who was identified with the Jones & Laughlin Steel Corp. for about 20 years, lately as assistant manager of the cold finished sales department, was recently made sales manager of the Union Drawn Steel Co., Beaver Falls, Pa., manufacturer of cold-rolled steel products. He succeeded to the duties formerly discharged by the late F. N. Beegle, who prior to his death served that company as president as well as manager of sales. For several months after leaving the Jones & Laughlin organization, Mr. Mitchell was identified with other Pittsburgh cold-drawn steel interests before becoming connected with the Union company. L. R. Davidson now is president of the Union Drawn Steel Co., having succeeded the late F. N. Beegle in that office. E. S. Hoopes is vice president and E. C. Rebeske is secretary and treasurer

Joseph Fournier has been appointed

treasurer of the Canadian Locomotive Co., Kingston, Ont., succeeding J. H. Birkett who resigned recently on account of ill health.

W. D. Thornburgh, Atlanta, Ga., has been appointed southern representative of the Russell Mfg. Co., Middletown, Conn., manufacturer of standard automotive accessories. Mr. Thornburgh was for the past five years southern representative of the Pennsylvania Rubber Co. and the Hube Rubber Co.

Frank L. Wilcox, president of the J. O. Smith Mfg. Co., Middletown, Conn., has been elected president of the Berlin Savings Bank, Berlin, Conn., of which he has been a director for 30 years. George E. Prentice, president of the G. E. Prentice Mfg. Co., Berlin, has been elected a director of the bank.

Stanley G. Flagg Jr., head of Stanley G. Flagg & Co., Philadelphia, and a past president of the American Foundrymen's asociation suffered an accident in which he broke his right arm, while enroute to the International Foundrymen's congress at Paris on the GEORGE WASHINGTON. After his arrival in Paris Mr. Flagg recovered sufficiently to be able to attend most of the sessions of the congress.

James L. Gough, in the machinery business in Chicago 30 years, has been made sales manager of the Stocker-Rumely-Wachs Co., Chicago. Mr. Gough's former connections include the Marshall & Huschart Machinery Co., the E. L. Essley Machinery Co., the Federal Machinery Sales Co., and the National Machinery Sales Co. For some months he has not actively been in business, owing to ill health.

William J. Priestley, metallurgical engineer at the Pittsburgh office, 817 Oliver building, of the Electro-Metallurgical Sales Corp., was until recently, works manager at Midland, Pa. for the Pittsburgh Crucible Steel Co. Prior to that time, he was steelworks superintendent at the United States navy ordnance plant, Charleston, W. Va. In his new connection, Mr. Priestley will act in a consulting metallurgical capacity for the company's customers.

Edward C. Smith, newly appointed director of pig iron sales of the Belfont Iron Works, Ironton, O., was for the past six years Central States representative of the Matthew-Addy Co. In his new connection Mr. Smith will have direct charge of pig iron production of the furnace company which has revised its business policy and which will sell direct to the trade beginning Oct. 1. Born at St. Paul, Minn., in 1876, Mr. Smith shortly thereafter moved with his parents to New York where he resided until 1900, when he entered the iron business in the Cincinnati office of the Dayton Coal & Iron Co. then under the management of W. J. Isaacson. In 1903 he went to St. Louis and became resident manager of the Field Evans Iron Co. The following year he was appointed sales agent in the St. Louis territory for the Sloss-Sheffield Steel & Iron Co. In September, 1912, he went to San Francisco, as manager of sales of refrigerating equipment of the Howe Scale Co. Six years later he returned to Cincinnati to join the sales force of the Matthew-Addy Co. when on Sept. 24 he resigned to take up his new position. Mr. Smith was

EDWARD C. SMITH

presented with a gold watch by the sales force of the Matthew-Addy Co. upon his retirement. Sales offices of the Belfont Iron Works Co. will be established in Ironton.

New Mill Started

The recently organized Walsh & McGee Steel Co. started operations at its new rolling mill at Newark, N. J., Sept. 17. The plant is equipped with an 8-inch mill and is producing ¼-inch and ⅜-inch bars and ¾-inch and 1-inch channels. Later it will make angles, special shapes and other light sections. The raw material for the mill comprises large bars or billets. Headquarters of the company are at 2 Rector street, New York and the officers are as follows: President, Harry L. McGee; vice president, Philip C. Walsh 3rd; secretary and treasurer, James A. Sheeran. Mr. McGee formerly was vice president and secretary of the Concrete Steel Co., New York.

Societies News

THE first meeting of the season of the Washington chapter of the American Society for Steel Treating was held Friday evening, Sept. 28, in the auditorium of the department of the interior building, Washington. Protective coating for selective case hardening was discussed by J. S. Vanick of the United States bureau of standards. Heat treatment of high-speed steel was discussed by H. J. French and continuous heat treatment by W. F. Graham. Several new members were welcomed by Jerome Srauss, chairman of the chapter.

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Inspect Power Development

The first fall meeting of the engineering society of western Massachusetts was held at Whitingham, Vt., Sept. 25. This town is the site of the largest hyroelectric power development in the East. The dam is 200 feet high and holds back 47,000,000,000 gallons of water. The total head utilized is 400 feet. Two 20,000-kilowatt units are now being installed.

Convention Calendar

Oct. 1-6—National Safety council. Convention and exhibition, Hotel Statler, Buffalo. W. H. Cameron, 168 North Michigan avenue, Chicago, is secretary.

Oct. 8-12—American Society for Steel Treating. Annual convention at Pittsburgh, W. H. Eisenman, 4600 Prospect avenue, Cleveland, is secretary.

Oct. 8-13—National Fire Protection association. International Fire Prevention congress, Seventy-first Regiment Armory, N. Y. The secretary of the association may be addressed at 25 East Twenty-sixth street, New York.

Oct. 15-20—American Gas association. Annual convention, steel pier, Atlantic City, N. J.

Oct. 23-24—American Society of Mechanical Engineers. Regional meeting, Chattanooga, Tenn. E. C. Patterson, general manager, Chattanooga Boiler & Tank Co., Chattanooga, Tenn., is in charge of details.

Oct. 24-26—National Association of Farm Equipment Manufacturers. Annual Meeting at Cleveland.

Oct. 24-26—American Welding society. Fall meeting at Pittsburgh. M. M. Kelley, 33 West Thirty-ninth street, New York.

Oct. 25—American Iron and Steel institute. Fall meeting, Hotel Commodore, New York. E. A. S. Clarke, 40 Rector street, New York, is secretary.

Oct. 25-27—American Gear Manufacturers association. Fall meeting, Mountain house, Lake Mohonk, N. Y. T. W. Owen, 2443 Prospect avenue, Cleveland, is secretary.

Oct. 29-31—American Management association. Meeting at Hotel Astor, New York.

Nov. 19-22—Electric Power club. Fall meeting at French Lick Springs hotel, French Lick, Ind. S. N. Clarkson, Rockefeller building, Cleveland, is secretary.

Dec. 3-6—American Society of Mechanical Engineers. Annual meeting, New York. Calvin W. Rice, 29 West Thirty-ninth street, New York, is secretary.

Dec. 3-8—Power and Mechanical Engineering— National Exposition, Grand Central palace, New York. Fred W. Payne and Charles F. Roth, Grand Central palace, New York, are in charge.

Dec. 5-8—American Institute of Chemical Engineers. Winter meeting, Washington. J. C. Olsen, Polytechnic institute, Brooklyn, N. Y., is secretary.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

THE Glancy Malleable Corp., Waukesha, Wis., which has taken over the lease of A. R. Glancy from General Motors Corp. on the Waukesha Malleable Iron Co., will equip a complete machine shop in buildings erected for the Samson Tractor Co., Janesville, Wis., to finish castings made at Waukesha for the Chevrolet Motor Co. factory in Janesville. Equipment purchases are being made now. The Janesville shop of the Glancy corporation will be enlarged gradually to handle malleable parts for other units of the General Motors passenger car factories in other cities. Some material is already being made for the Buick company at the Waukesha foundry. Officers are: A. R. Glancy, president; L. A. Williams, vice president; E. F. Carson, treasurer and L. D. Harkrider, secretary.

* * *

THE Beede Electrical Instrument Co., Penacook, N. H., has purchased the plant of the Whitney Electrical Instrument Co., adjoining its own and will expand. The former owner has moved to Bethlehem, Pa.

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CONSTRUCTION work on the new building being erected under the supervision of Lockwood, Greene & Co., engineers, for the Saco-Lowell Shops nears completion. A new forge shop on the ground also will be ready soon for operation.

* * *

THE Wright Machine Co., Worcester, Mass., incorporated Aug. 11, has begun operations in the former plant of the R. B. Phillips Mfg. Co., 3 Grand Street court, that city, and which has been idle three years. Its products will be machine screws and accessories.

* * *

THE American Emery Wheel Co., Providence, R. I., plans to be actively operating in its new home here shortly after Jan. 1, 1924. The new plant will consist of two buildings having approximately 35,000 square feet of floor space.

* * *

THE new shops of the Atlantic Coast Line railway at Montgomery, Ala., will treble the capacity of the present plant and will represent an investment of around $500,000. Contracts are to be awarded shortly for the construction work.

* * *

A BUILDING, 135 x 102½ feet, of reinforced concrete, will be constructed by Sam S. Glauber, Inc., Seventy-ninth street and Second avenue, New York, manufacturer of plumbing and heating materials. The structure, being built by the Turner Construction Co., will contain offices and warehouse.

* * *

THE Phillips Custom Body Co., Cleveland, has purchased the Trumbull Mazda Lamp Co. plant on West Market street, Warren, O. and will use the building for the manufacture of closed car automobile bodies. The Phillips company recently purchased the Artcraft Top Co., Cleveland.

* * *

HENRY CARPENTER, Chicopee Falls, Mass., has leased the idle iron foundry of the late Herbert B. Murlless, Rockville, Conn., of the Hockanum Mills Co., that city, which recently acquired it, and plans to begin operations as soon as it can be put in shape.

* * *

THE Fulton Supply Co., Atlanta, Ga., machinery and equipment jobbers in the South, announce the recent addition of a department devoted exclusively to the jobbing of contractors' machinery and equipment. D. F. Shanahan, well known as an equipment engineer in the South, has been named manager of the department.

* * *

THE Mid-City Engineering Corp., 104 North Franklin street, Chicago, was recently organized to handle a wide class of building and construction work including, bridges, dams, docks, sewers, subways, tunnels waterworks, etc. John J. Teal, is president of the corporation, John E. Fitzpatrick, vice president and treasurer, John T. Fanning, vice president and C. M. Fitzpatrick, secretary.

* * *

INDIANAPOLIS is to become the central western distributing center for the Standard Sanitary Mfg. Co., Pittsburgh, it was announced following the purchase by that company of property at the corner of Pratt street and Senate avenue, Indianapolis, as the site for a warehouse to cost $150,000. The warehouse will be a 2-story steel and reinforced concrete structure and will have the same dimensions as the site which has a frontage of 204 feet on Senate avenue and 162 feet on Pratt street. The Standard Sanitary Mfg. Co., manufactures porcelain, enameled and vitreous china, and brass plumbing materials.

* * *

THE Selflock Nut & Bolt Co., Inc., East Syracuse, N. Y., manufacturer of friction fit nuts and bolts, has contracted with the Bethlehem Steel Co., for the manufacture and sale of carriage and machine bolts, track bolts and heavy railway nuts and bolts. The Selflock company will increase its own facilities and specialize on its own products as well as on cap screws with threads.

* * *

A TWO-STORY, reinforced concrete building is being constructed for the Pelton Water Wheel Co., Inc., San Francisco, hydraulic engineer. The building will contain offices, engineering and designing departments, pattern storage, pattern shop and pump assembly department. The old building, after the removal of these departments to the new structure, will be devoted to machine shop work and assembly of hydraulic turbines. The additional facilities will about double the manufacturing output. A considerable amount of machine tool equipment remains to be purchased.

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PRODUCTION of a patented furnace and the operation of a general commercial foundry will be carried on by the Oakland Foundry & Furnace Co., Oakland, Cal., which will soon move its plant to its new site on Third street, West Berkeley, Cal.

* * *

WILLIAM J. COLLINS, who has been connected with the Milford Iron Foundry, Milford, Mass., is to organize the William J. Collins Foundry Co., Inc., and erect a foundry in that town, if the town will sell him the land. A special town meeting has been called for Oct. 9 to act in the matter.

Obituaries

WILLIAM HENRY BALDWIN at one time prominent in the iron and steel industry, died in Washington, Sept. 26 at the age of 72 years. He was born in Youngstown and educated at Rayen high school, Youngstown, and Western Reserve university, Cleveland, being trustee later of both institutions. He began his business career as cashier of the First National bank, Youngstown, where after 10 years of service he resigned to become manager of the bolt manufacturing plant of Arms, Bell & Co., Youngstown. Here he remained until the works burned in 1899.

He then assumed managership of the Youngstown Rolling Mill Co., Youngstown, now the Upper Union works of the Carnegie Steel Co. there. He was later made secretary of the Ohio Steel Co. and when that company was absorbed by the National Steel Co. he was made secretary of the latter, which position he filled until the company was acquired by the United States Steel Corp. Since that time he has resided in Washington where he has taken an active interest in educational and social problems.

Harry F. Bennett, president of the Chicago Metal Mfg. Co., Chicago, died Sept. 27, a victim of pneumonia.

Charles E. Lyman, head of the Lyman Gun Sight Works, Middlefield, Conn., died recently at the age of 66 years in that city.

William C. Meyer, inventor for the United Shoe Machinery Corp., Beverly, Mass., died at his home in that city, Sept. 22, aged 62 years. He had been with the corporation for 35 years and had invented a well known stitch and sewing machine.

Harry W. Strand, general superintendent of the Berkshire Mining Co., Mellen, Wis., died at Minneapolis Sept. 20 at the age of 32 years. He was a graduate of the University of Minnesota and prior to joining the Berkshire organization was consulting engineer of the Arthur Iron Mining Co., Hibbing, Minn. Although a young man, Mr. Strand was one of the best known engineers in the Mesabi district.

Harry F. Bennett, president of the Chicago Metal Mfg. Co., Chicago, died Sept. 27 at the Illinois Central hospital, that city.

Herbert A. McKinnon, secretary and treasurer of the McKinnon Iron Works, Ashtabula, O., died in that city Oct. 1 following complications from typhoid fever. He was well known among marine men.

C. K. Sutton, well known to eastern foundrymen as a pig iron and coke salesman in the general New York territory for the Debevoise-Anderson Co., died Sept. 17 of pneumonia at his home in Indiana, Pa. Mr. Sutton also was manager of the Debevoise-Anderson Co.'s coal department. At the time of his death he continued as a director of the Debevoise-Anderson Co. but was active principally as general manager of the Prairie State Incubator Co., Homer City, Pa.

N. B. Norris has been appointed branch office manager of the New Orleans office of the Pawling & Harnischfeger Co., Milwaukee, manufacturer of electric cranes, machine tools, etc. The office is situated at 938 Whitney-Central building.

Merrit A. Potter, last survivor of the original incorporators of E. C. Atkins & Co., Indianapolis, manufacturer of saws and tools, died Sept. 25, after a long illness, at the age of 68. He had been identified prominently with the business and civic life of Indianapolis for 40 years.

He was born Aug. 1, 1855, at Clarkston, Mich., and he attended the University of Illinois, coming to Indianapolis in 1874. In 1878 he became associated with E. C. Atkins & Co. For two years following his connection with the Atkins company he acted as manager of the Hecla Consolidated Mining Co. of Montana, of which Mr. Atkins was superintendent and one of the large stockholders. When E. C. Atkins & Co. was incorporated in 1885, he became treasurer and one of the incorporators. He served in that capacity until 1911, when he became secretary.

Adopt Memorial to Late Harvey H. Brown

The board of directors of the Shenango Steamship Co., at its meeting in Pittsburgh, Sept. 26, adopted the following memorial to the late Harvey H. Brown, prominent iron ore operator, pig iron manufacturer and industrial executive who died at his home in Cleveland, Aug. 2, at the age of 75 years.

In the death at his home in Cleveland on the second day of August, 1923, of Harvey H. Brown, a member of this board since the incorporation of the company, and its vice president for many years, the surviving members of the board have sustained the loss of a wise counsellor in all matters having to do with the business of the company, and in the bereavement they mourn the absence of a genial and warm-hearted friend. In common with men connected with the many enterprises in which Mr. Brown was a leading spirit, we have a sense of more than the common sorrow which attends such an occasion as this, because of the outstanding qualities of mind and heart which are so firmly established in the memory of his friends as characterizing his unusual personality.

Mr. Brown was the valued friend and counsellor of the founder of this company. His intimate knowledge of all matters connected with transportation on the Great Lakes formed the cornerstone of the company's foundation and has been one of its most valuable assets during its development.

It is the desire of the board that these expressions be spread upon the minutes of the company, published in the papers of Cleveland and that a suitably engraved copy thereof be offered to Mr. Brown's family.

By order of the Board,
ATTEST:
C. D. DYER,
Secretary.
WM. P. SNYDER JR.,
President

Shows Gas Composition

(*Concluded from Page* 963)

H. These instruments are calibrated in percentage of CO or CO plus H_2. As the combustion heat of a given volume of H_2 is almost identical with that of CO, the CO meter may serve for a mixture containing both gases. For boiler house practice it is not necessary to know what fraction of the sum is CO and what fraction is H_2; the important thing is the indication that these combustibles are present and to what extent combustion is incomplete. Methane or other hydrocarbons are not indicated but they occur only in small quantities except where the CO content is extremely high. The apparatus may be either indicating or recording.

Seize Ruhr Steel

(*Continued from Page 932*)

products having been sought by the minister of public works, it is understood that the Comite des Forges, Paris, has undertaken to set up a commerical organization for handling the 300,000 tons of scrap, and also to sell the other material. Consignments from the Ruhr are to be subject to the French import duties, either under the general tariff or the minimum tariff. It has not been definitely settled which tariff will apply.

Belgian Demand Brisk; Prices Advancing

European Staff Special

BRUSSELS, Sept. 21.—The market is firm and prices are being advanced slowly. Mills are heavily committed and have ceased to quote except upon choice specifications.

Pig iron production is being maintained at the highest point possible in keeping with the coke supply. Prices remain unchanged except for basic bessemer iron which has moved up slightly due to the scarcity.

Semifinished products have been advanced again as many of the mills have withdrawn from the market. Premiums are easily obtained for prompt delivery. The export demand for structural shapes and bars is brisk, but the mills have nothing to offer. Unheard-of prices are being demanded for light special sections. If American mills could offer prompt delivery on window sash sections and other similar products, there would be a market for them in Belgium.

Franc—$0.05

Pipe mills have recently been obliged to turn down business which has been offered them for export. Most of the pipe made in Belgium is manufactured by the Tubes de la Meuse, a subsidiary of Escaut & Meuse, the well-known French tube concern, and the Tubes de Nimy. These mills have been doing a very satisfactory export business. Spain in particular has been buying large quantities of pipe in Belgium. The Belgium tube mills enjoy a low rail and water rate to Spanish ports and moreover they make a very light grade of pipe which is of great importance to the Spanish importer. The Spanish duties are based on weight and are extremely high, so even the cheapest pipe is sold in Spain at nearly double the prices now prevailing in the United States. American tube mills have sold considerable tonnage in Spain, but since the revision of tariffs this market is closed to both America and England. In fact the present high price of pipe in Spain has been brought to the attention of several Bilboa capitalists who have taken over an old plant which they will equip with new gas producers, furnaces and modern machinery for the purpose of manufacturing pipe in Bilboa for the Spanish market.

Japan Places Bar Orders in Canada

Foreign Special Service

TORONTO, Ont., Oct. 1.—Notwithstanding the reduction of $2 per ton in the price of pig iron which went in effect on Sept. 21, no improvement is reported in business either for spot or last quarter delivery. Production of pig iron continues at a high rate and it is reported that the British Empire Steel Corp., is contemplating blowing in a fourth furnace at its Sydney plant to supply its own needs. The daily melt shows little change among foundries, but it is stated that only small quantities of pig iron are held in stock. Melters are expected to show more interest in the market in the early future. Prices are as follows: No. 1 (2.25 to 2.75 silicon) $31 and malleable, $31; No. 2 (1.75 to 2.25 silicon) $30; Toronto: No. 1 and malleable, $33.50; No. 2, $32.50, Montreal.

Demand for finished iron and steel is showing steady improvement, in the domestic and export market. The Steel Co. of Canada, Hamilton, Ont., and the British Empire corporation have recently closed extensive orders for bars for shipment to Japan. The domestic demand for bars also is making progress. Mills continually are closing orders, but in smaller tonnages than formerly. Bars are firm at 3.10c, Toronto. In the market for structural steel producers report good sales, although some rush orders for works to be completed before winter. During the past week or two, orders involving large tonnages have been closed. Shapes and beams are quoted at 2.70c, Toronto. Plate producers report good sales, although some Canadian business in plates is going to American mills. Plates are unchanged at 2.60c, Toronto. A stronger demand for sheets is noted. Canadian mills have received inquiries for tonnages for Japan. Buying of galvanized sheets is improving steadily. The market for black and blue annealed sheets is quiet, but a stronger demand is expected in the near future. No. 28 black sheets are quoted at 4.60c, No. 10 blue annealed, 3.70c, and No. 28 galvaninzed at 6.00c Toronto.

Steel plants are coming into the market from time to time for heavy melting steel and turnings for which dealers are offering $14 and $10 per gross ton, respectively. Wrought iron and steel axles are quiet, dealers offering $18 per gross ton for wrought and $16 for steel axles. Boiler plate is in small demand but dealers are taking small quantities at $12 per gross ton. Some improvement is reported in machinery cast from foundries and dealers are buying fairly large tonnages at $19 per net ton, Toronto. Malleable scrap and stove plate are in limited demand, with dealers offering $15 per ton net.

The rail mill of the Algoma Steel Corp. has been closed down for an indefinite period. The 18-inch merchant mill has sufficient orders to keep it going for a month or more but the 12-inch mill is expected to close shortly. Two blast furnaces are running.

Sales Meetings Resumed

The annual general sales conferences of the Norton Co., Worcester, Mass., which were discontinued in 1920 were resumed Sept. 24 to 29, being attended by about 75 representatives of the wheel and machine divisions from all over the United States and Canada. The meetings were held under the direction of W. LaCoste Neilson, vice president and general sales manager, and Howard W. Dunbar, assistant general sales manager. Lectures, discussions and entertainment featured the program.

Valley Rolling Mills Inc. Acquires Elmira Plant

The Valley Rolling Mills, Inc., has been organized and incorporated under the laws of New York state to acquire the steel plant at Elmira, N. Y., recently designed and constructed by Edward F. Quirke and John S. Quirke. The property embraces an open-hearth steel plant and billet, bar and band mills. Originally the site was occupied by the plant of the old Elmira Rolling Mills, maker of high grade iron bars. This plant was purchased by the Quirkes who dismantled the iron making equipment. Edward F. Quirke is president of the Valley Rolling Mills, Inc., in general charge. Marcel K. Sessler is vice president and treasurer in charge of sales. John S. Quirke is general superintendent, in charge of operations. L. A. Anderson of Morrell, Bates, Topping and Anderson, New York, is secretary and counsel. The products of the company comprise billets, bars, bands, small angles and channels of plain carbon and spring steel quality.

The main offices of the Valley Rolling Mills, Inc., are at 120 Broadway, New York.

"Real" Wages at New High Level

Steady Work with Increased Pay Establishes American Workman's Position as Better Today Than Ever Before, Industrial Conference Board's Analysis Shows—Continued Increase in Rent Is Most Significant Item in Family Budget

SUSTAINED high levels in the cost of living and, to a greater degree, in the earnings of the American workingman are revealed in two research reports issued by the National Industrial Conference board, New York. The reports cast new light on the trend of what it costs the average American family to live, and what the head of the family has left in his pay envelope when the bills are paid.

These trends, which have been the cause of considerable research by economists during the past six months, are summarized by the board in its reports, and studied in detail. The study on wages, hours and employment in American industries is the first of its kind the board has completed since the beginning of the year, and the report on cost of living changes is the first since last March. A great part of the recent sessions of the board in New York was devoted to consideration of the present wage and cost of living situation.

In brief, the wage situation reflects at present a higher level for "real" earnings, as weighed with what these earnings will buy, than at any time since before the war, not excepting the so-called "peak" period of 1920. The cost of living in July, the latest time when comprehensive figures were available for a survey of this magnitude, was 61.9 per cent above the 1914 level, and this was a decline of 20.8 per cent from the peak of high prices in July, 1920. Most noteworthy were the increases in rents throughout the country. The rent item in the average family budget in July last was 75 per cent higher, the board's figures show, than in 1914, and even higher than their former peak of 71 per cent in the spring of 1921.

Living Costs Higher

Since March, 1922, there has been a gradual but steady rise in the cost of living of 4.7 per cent to July last. Between March and July of this year the increase was 1.7 per cent.

The same sources were used in the inquiry as in the conference board's 15 preceding cost of living reports since 1914. The retail food price index numbers of the United States bureau of labor statistics were used as a basis for establishing changes in the cost of keeping the family larder filled.

Changes in the various budget items were weighed in accordance with the importance of the item in the total budget of families before the war. The combined increase thus obtained shows the rise since 1914. Between March and July this year food prices increased 3.5 per cent. In July they were 47 per cent above the prewar level, but had declined 33 per cent from the peak of July, 1922. There was a noteworthy difference in the relative increase in the price of food from city to city among the 39 reporting changes in the past nine years. In Washington, with 58 per cent; Chicago and Detroit, 57 per cent each, and Richmond, 56 per cent, the increases were more than twice as great as the smallest advance, in Salt Lake City, of 27 per cent. For the most part the least rise in food prices was noted in the Far West, advances in the East and Middle West being uniformly greater.

In New York the food price increase between 1914 and July last was 53 per cent, one of the highest in the country. In the present year up to July the increase was 5 per cent. Detailed study of the boosts in the costs of various foods shows that the potato led the procession with a rise of 147 per cent since 1914.

Since July three years ago, decreases have been shown in the food, clothing and sundries items of the family budget, and increases in shelter, fuel and light. Between March and July this year only the items of fuel and light showed any decrease, but there was no change in sundries, including amusements and other unclassified forms of family expenditure.

As to rising rents, which give the conference board's research experts the greatest cause for comment, it is found that there was an average increase in rents of 3 per cent between March and July this year. It was significant, however, that rent inflation seems to have subsided somewhat in the larger eastern cities, such as Boston, Buffalo, New York, Baltimore, Philadelphia and Pittsburgh, all of which report either no changes or a very small increase. Washington had an increase in this period of between 11 and 20 per cent. In the middle west, 25 cities reported higher rents, while landlords were reducing their bills in six only. In the remainder of the 59 cities reporting in this section no change had occurred. However, rent increases which averaged 100 per cent or more since 1914 were in effect in 32 cities. Chicago has been added to this group since last March, and Detroit, Los Angeles and Milwaukee also report doubled rents.

Wages Keep Pace

The average cost of clothing increased less than 1 per cent between March and July this year. Clothing prices in July had declined 39 per cent since March, 1920, when their peak totaling 177 per cent since prewar days was attained. Budget totals worked out by the conference board's research staff show that it cost only 0.8 per cent more for the average family's clothes in July than it did in March. The decline in the past three years has been 36.3 per cent, and the net increase in the family clothing bill since 1914 was 70 per cent.

Most significant of all, however, is a comparison of the report on the cost of living with the concurrent report on wages, hours and employment—the first time such a comparison on the basis of the board's authoritative figures has been made possible in nine years. Especially noteworthy is the decided advance in "real" earnings, which establishes the contention of economists that the American workingman is better off today than he ever was before. During the first half of 1923 increased pay and a higher level of hours worked resulted in substantially increased earnings. The comparatively small increase in the cost of living for the same period materially increased weighed or "real" earnings which reached levels well above those attained during the months of so-called peak wages in 1920. In June the "real" or weighed hourly earnings were 40 per cent above the 1914 level, and the weekly earnings 35 per cent higher.

Orders Increase

For Various Refractories—Silica Brick Holding Firmly at $45

Pittsburgh, Oct. 2.—More inquiries are out for refractories, and more people are interested in that commodity to the extent of ordering small lots, than has been the case in many weeks. From the order books of several makers it would appear that more brick orders have been placed in the past two weeks than in the preceding two months, and inquiries have been more numerous in the last 10 days than in the preceding six weeks. It is evident that inventory stocks are becoming depleted and buying has to be done; consumers' stocks in any event are not large.

Sellers accordingly are much encouraged over the outlook for good business this fall. Contributions from the iron and steel industry to the new orders are of small proportions so far, although in those lines several owners are taking advantage of the present lull to make needed repairs to the linings of open-hearth, bessemer, heating and other furnaces, as well as soaking pits, etc. Orders for fire clay usually run from 50,000 to 200,000 brick at a time although the Duquesne Light Co. this past week closed on about 750,000 brick for Colfax, Pa., boiler settings.

Large producers of silica brick, holding firmly to the $45 price, have lost some pleasing business of late to price cutters. Typical orders thus lost involve 90,000 to 300,000 brick. One user in the east bought 225,000 silica brick at below the $45 price, and a typical inquiry now before the trade calls for 150,000 each, fire clay and silica. Chrome brick continues to sell in small lots up to 50,000 brick at a time, three sales made within the past few days aggregating 100,000 brick at the full price of $50. Small orders alone are noted in magnesite, mostly single carloads at the $65, seaboard base, figure.

Refractories

FIRE CLAY BRICK
(Per 1000 f.o.b. works)

Pennsylvania, No. 1	$45.00 to 48.00
Pennsylvania, No. 2	43.00 to 46.00
Ohio, No. 1	45.00 to 47.00
Ohio, No. 2	40.00 to 43.00
Illinois, No. 1	48.00 to 50.00
Illinois, No. 2	45.00 to 47.00
Kentucky, No. 1	45.00 to 47.00
Kentucky, No. 2	40.00 to 42.00
Missouri, No. 1	43.00 to 45.00
Missouri high grade	48.00 to 53.00
Maryland, No. 1	48.00 to 51.00
Maryland, No. 2	42.00 to 45.00

SILICA BRICK

Pennsylvania	42.00 to 45.00
Chicago	52.00 to 54.00
Birmingham	53.00

MAGNESITE BRICK
(Per Net Ton Seaboard Base)

9 x 4½ x 2½	$65.00

CHROME BRICK
(Per Net Ton)

9 x 4½ x 2½	$50.00

High Labor Costs Reduce Shipbuilding Profits

The American Shipbuilding Co., Cleveland, reports net operating income of $238,471 for the fiscal year ended June 30, 1923. Gross earnings were $2,010,000, from which $756,114 was added to surplus. The addition to surplus in the previous year was $1,490,446. After deduction of dividends, the surplus account as of June 30, was $7,024,758 compared with $7,221,388 at the close of the previous year.

Although the year's business was satisfactory and a large volume of new construction, reconditioning and repair work was turned out, earnings were disappointing because of the increased labor costs, reports M. E. Farr, president of the company.

The company delivered four bulk freighters during the year and closed contracts for one bulk freighter, one self-loading freighter and two large passenger steamers. The company's Wyandotte ship construction plant, which was closed in 1921, has been abandoned and will be offered for sale.

Reports Half Year Net

Net income of the Iron Products Corp., New York, for the first six months of 1923 amounted to $1,003,964, before federal taxes. Earnings after operating costs were $1,278,015, and the surplus after preferred dividends was $964,472. Federal taxes, according to the statement are expected to be negligible and will not affect the result shown.

Foundries Net Good

American Steel Foundries for the six months ended June 30 last reports net income of $3,459,324, after charges and taxes. R. P. Lamont, president of the company, said its operations were at 100 per cent in August and during the current month were between 95 and 100 per cent. By the end of the year, he added, operations probably will have been tapered down to 60 per cent, owing to the fact that purchases of new cars and locomotives by the railroads are almost negligible. From the standpoint of earnings, however, he said the company's year will be one of the best.

Export Prices

On Sulphate of Ammonia Decline—Light Oil Distillates Weak

New York, Oct. 2.—Inactivity has again forced a revision in sulphate of ammonia prices. While ammonia for domestic account is unchanged at $2.95 to $3.00 works, material for export is quoted at $3.25 to $3.30 port, in double bags, a decline of about five points and in all likelihood prices could be shaded even greater. Sellers look for little improvement in demand immediately although they expect fertilizer manufacturers to come into the market a little later in the fall for material to supplement their regular annual contracts.

Weakness is still reflected in light oil distillates, although the market range is practically the same as last week. Pure benzol may be quoted at 25 to 27 cents works in tanks and 32 cents in drums; 90 per cent benzol 23 to 25 cents in tanks and 30 cents in drums; toluol, 28 to 30 cents in tanks and 35 cents in drums; solvent naphtha, 25 to 27 cents in tanks and 32 cents in drums; commercial xylol, 27 to 29 cents in tanks and 34 cents in drums. These prices are all subject to shading in isolated cases.

Naphthalene is holding at 9 cents works for balls and 8 cents for flakes. Demand of late is somewhat improved due to buying by the drug trade but has not as yet reached sufficient volume to affect prices.

Coke Oven By-Products

Spot*

Per Gallon at Producers' Plants in Tank Lots

Pure benzol	$ 0.25 to 0.27
Toluol	0.28 to 0.30
Solvent naphtha	0.25 to 0.27
Commercial xylol	0.27 to 0.29

Per Pound at Producers' Plants

Phenol	$0.26 to $0.28
Naphthalene flake	0.08
Naphthalene balls	0.09

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	$3.00 to $3.05

Contract

Pure benzol	$0.27
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.28
Naphthalene flake	0.08
Naphthalene balls	0.09

*Spot distillates are subject to shading.

The Union Hardware Co., Inc., Torrington, Conn., has issued $1,200,000 of unissued preferred capital stock, making its total outstanding capitalization $1,800,000.

Machinery Sales Show Increase

Volume of Business in September Slightly Greater than in August—Automotive Industry Buying Bulk of Equipment—Second Hand Market Is Slack —Crane Sales Confined to Special Machinery

SEPTEMBER sales of machine tools were in excess of the total realized during the month of August, according to reports from dealers in the leading centers, although the volume of business at this time is below that anticipated for this period earlier in the year. The past week has been quiet with new orders closed. Industrial plants purchasing equipment during the week include the Illinois Steel Co., the Fruit Growers Express, and the Farrell Foundry & Machine Co., Ansonia, Conn. The recent list of Gray & Davis Inc., Boston, has been transferred to an affiliated company, the Bosch Magneto Co., Springfield, Mass., and the greater portion of the list was closed during the past week. The Japanese government is inquiring for 300 tools.

While the railroads are not buying heavily at present, it is thought a better movement will be evident in the near future. The Pennsylvania is reported as about ready to begin buying of its recent lists. The Lehigh Valley, Southern and The Central of Georgia are in the market for a few items, as is the Pullman Co. The Southern Pacific has been a further buyer of equipment. The Alaskan engineering commission has purchased two items.

Probably the heaviest buyers of equipment at this time are the makers of automobiles and automobile accessories. Special tools for increasing production are being installed and advantage is being taken of the present period, with production below capacity, to make a few necessary replacements of worn out tools. However it is not likely that the peak of the demand from the automotive industry will come until the plants are operating at a high rate of capacity, a condition expected after the first of the year.

Sales and inquiries in the used machinery market are still below the expected volume. This market has been affected by the numerous tools that are being thrown on the market at various auction sales.

The crane market is generally slow although several good sales are reported for the week. Makers are finding more of a call for special type cranes than for the standard designs at the present time. Better buying in this market is looked for about the first of November.

Railroads Developing Better Tool Demand

NEW YORK, Oct. 2.—Featuring the local machine tool market is a rapidly growing inquiry from Japan. One large machine tool house has received an inquiry for 100 machines all of the same type, and in all has on file Japanese inquiries, involving approximately 300 standard machines. These inquiries have been issued through local Japanese houses, but in most instances the specific destinations of the equipment is not mentioned.

Meanwhile trading continues slack, with the month just closed one of the slowest this year. In fact, there has been little in the way of active buying in this district since June, which was a fairly good month. Included in the scattered orders of the past week is a 36-inch lathe for the Illinois Steel Co., a 48-inch, 400-ton hydraulic steel press for the Fruit Growers Express, and an 800-pound steam hammer for the Farrell Foundry & Machine Co., Ansonia, Conn.

It has been recently learned that the Alaskan engineering commission, of the department of interior, awarded two 16-inch heavy duty lathes to a Cincinnati builder. The Southern Pacific has been a further buyer, closing on flue welding equipment. The Lehigh Valley is receiving prices on six or seven machines.

Calendar and Selected News of Plant Liquidations, Wholesale Offerings, Auctions of Used and New Equipment, Etc., page 140, Classified Machinery Section.

While the crane market generally continues slow, buying has improved slightly. Included in recent orders are five or six locomotive cranes.

September Sales Increase

CLEVELAND, Oct. 2.—According to reports from dealers, sales of machine tools and shop equipment during the month of September showed a slight increase over the total realized during August. While the trend of the market during the past month has been toward a heavier volume of business, dealers feel that sales have not been as great as should be realized at this time of the year. Dealers in new machinery report a rather quiet week inasfar as sales are concerned, little business being reported.

A great part of the equipment being purchased in this territory being taken by the automotive and allied industries. While few tools are being ordered for expansion purposes, purchases of special machinery are being made from time to time with the main idea of increasing production or replacing worn out equipment. It is reported that the automobile manufacturers anticipate no great increases in the production of cars before the first of the year, indicating that the purchases of machine tools from this source will continue at about the same rate during the remaining quarter of this year.

Although increases have been noted in the building industry, there seems little likelihood of the activity being reflected in the machinery market. Purchases of material requiring a certain amount of machine shop work have been well within the present capacity of the plants equipped to handle this business, and all purchases of tools for this industry will probably be used for replacement purposes only.

Inquiries continue to maintain a good rate and dealers believe prospects bright for a satisfactory increase in sales during the month of October. However, lists include only a small number of tools.

The condition of the used machinery market continues about the same. Sales have been rather light, and inquiries in many cases have fallen off. Considerable used equipment is available in this district.

Buying in the crane market is slack, special equipment rather than standard material being in greatest demand. This is due in part to the fact that road contractors have completed purchases for the year. However, better buying is expected to start about the first of the month and continue into the middle of next summer.

Expect Better Business

PITTSBURGH, Oct. 2.—Another quiet week has been passed by the machine tool trade. Orders all have been small, only for one, two or three items at a time. Encouragement is felt however, over the outlook and it now begins to look as if the Pennsylvania railroad soon will start to buy groups of tools for various shops on its recent lists, bids on which have been in process of tabulation for several weeks.

While it is not expected that the fourth quarter will be as good as the first from a machine tool selling standpoint, sellers believe it will be better than the past month or two. Many of the large and small steel companies in this territory are planning to buy equipment, or contemplate expansions of various sorts for which equipment will have to be purchased. Some promise that orders will be forthcoming within the next few weks and apparently more people intend actually to buy than has been the case recently. Three or four cranes have been ordered, including it is understood, some for the Truscon Steel Co., Youngsown, O., and one for the Pennsylvania railroad.

Railroad Inquiries Out

CINCINNATI, Oct. 2. — Scattered orders, involving principally single items comprise trading in machine tools here. In fact, were it not for a few fair-sized railroad inquiries and the unusual activity in other branches of industry, the local market would take on a dull aspect. The Southern railroad is in the market for a few items as is the Central of Georgia.

The automobile industry continues to furnish the bulk of machine tool demand from the general manufacturing trade. However, this is not as large as formerly, at least not for standard tools. Electrical equipment manufacturers are steadily increasing their operations and considerable tool buying is expected by these interests shortly. Crane orders are not large. Inquiries for this class of equipment are not exceptionally numerous nor sizable, although the volume of business in prospect is considerably larger than that of the past few months. The Cincinnati River-Rail Terminal Co., Cincinnati, is inquiring for a crane for its new terminal on the Ohio river. The volume of business in September was slightly more than that in August, which was the lightest month of the year, insofar as actual sales were concerned.

Demand Continues Good

TORONTO, Ont., Oct. 2.—The demand for machinery and machine tools continues good in the Canadian market, with slight improvement reported for the past week. Small lot buying continues the feature of the market and builders and dealers say that orders for one or two machines of tools are fairly numerous, but large lists are absent from the market. Present inquiry, however, leaves the impression that some good sized lists will shortly make their appearance as several concerns with manufacturing plants under way are showing interest in the equipment market, and inquiries for tools and machinery for automobile plants, garages, electrical development projects, pulp and paper mills, saw and lumber mills and for mining undertakings are coming to hand in larger numbers than has been the case for some time past.

While the demand for new tools is good it is now pointed out that buying interests are again turning to rebuilt lines and the call for these is going ahead rapidly. The present demand runs strongly to tools for replacement purposes and with the continued activity in practically all lines of manufacture industrial concerns are continually needing machinery to keep their plants up to capacity and in condition to cope with ouside competition. Small tools are also holding up and a strong tone is reported in all lines of small tools and supplies.

Textile Plants Busy

BOSTON, Oct. 2.—Machine tool activity in New England showed some improvement during the last

Crane Awards and Inquiries of the Week

Orders Placed

One 25-ton locomotive crane for the National Plate Glass Co., Ottawa, Ill., to the Browning Co.

Three or four cranes for the Truscon Steel Co., Youngstown, O., to an unnamed builder; lot includes one 10-ton.

One 5-ton ashpit bucket crane for the Pennsylvania railroad, Olean, N. Y., to the Northern Engineering Works, Detroit.

One 25-ton, 28-foot 3-inch span, 4-motor overhead traveling crane with 5-ton auxiliary for the Packard Electric Co., Warren, O., to the Cleveland Crane & Engineering Works, Wickliffe, O.

One 15-ton locomotive crane equipped with magnet, for the Bryden Neverslip Co., Catasauqua, Pa., to the Brown Hoisting Machinery Co.

One 15-ton locomotive crane, 40-foot boom, for the Safety Insulated Wire & Cable Co., Bayonne, N. J., to the Browing Co.

One 20-ton locomotive crane for the Cleveland Trinidad Paving Co., Flushing, L. I., to the Brown Hoisting Machinery Co.

One 20-ton locomotive crane, 50-foot boom, for the American Gas & Electric Co., awarded through the Foundation Co., New York, to the Brown Hoisting Machinery C-

One 12-ton crawler locomotive crane, equipped with ¾-yard bucket and 35-foot boom, for S. A. Dun & Son. Rensaeller, N. Y., to the Orton & Steinbrenner Co.

One 30-ton electric crane, 51-foot pan, for the United Electric Railways, Providence, R. I., to the Northern Engineering Work.

One 3-ton electric crane, 28-foot pan, for the Transit Supply Co., St. Paul, Minn., to unnamed builder.

Six electric overhead cranes for the Ford Motor Co., to the Cleveland Crane and Engineering Co. The order includes one 40-ton, and one 20-ton crane for St. Paul, and one 30-ton and one 20-ton for Iron Mountain, Mich.

Orders Pending

Twelve 2-ton electric overhead cranes, six with a span of 45 feet, 7 inches, and six with a span of 28 feet, 11 inches, for pier No. 7, Manila, on which bids were closed Sept. 26, through the purchasing office of the government of the Philippines, 17 Battery place, New York. While early action was indicated in the request for proposals, it may be two or three months before a definite decision is reached. Eventually, it is proposed to install 48 electric overhead cranes. The above list is in addition to an inquiry issued some time ago by the Philippine government through its offices at 17 Batter- place, for 10 wharf cranes, reported previously in this column. Bids were closed Sept. 17, but no action has yet been taken.

Two 250-ton electric overhead cranes for the Public Service Corp., Newark, N. J., bids asked.

One 3-ton electric crane for the Third Avenue Railways, New York, pending.

Two 15-ton cranes for the International Paper Co., Pershing square building, New York; recommendations made.

week in September with the result that several dealers report a total for the month in excess of that for August. Sales still are below expectations, but a new note of cheerfulness seems apparent in the trade. Notable among the sales of the past week was the closing of a large part of a list of tools issued some weeks ago by the Bosch Magneto Co., Springfield, Mass. This is the same list which has been pending for some time originally being issued by Gray & Davis, Inc., Boston, and now being transferred to the affiliated concern in Springfield. It is understood that between 15 and 20 tools have been purchased on this account. Several textile machine manufacturers have been in the market for tools. An eastern Massachusetts concern bought a large shear and two other tools. Another manufacturer bought four or five tools. A Rhode Island manufacturer bought a special planer and several other tools. The Rutland railroad bought a single tool which is a disappointment to the trade as this road has had a list out for many months. Inquiry includes a list of tools for a new concern which is to manufacture material handling machinery. Crane inquiry again is active after a period of lull. However, no sales of importance as yet have been reported. Prices are unchanged, and some manufacturers are giving their agents assurance against any reduction during the next 60 days.

Demand Is Better

CHICAGO, Oct. 2.—Machinery dealers in Chicago are experiencing heavier inquiry but placements continue at the low ebb that has prevailed for several months. The Pullman Co. is expected to come into the market shortly for a few small items of equipment, including a pipe machine and a 4-foot radial drill. The Illinois Central railroad is seeking four tools, while the Burlington railroad is expected to close shortly on the sizable list that has been before the market several weeks. A Chicago dealer reports having closed some fair sized business the past week from a Wisconsin buyer. The Elgin, Joliet & Eastern railroad has ordered a 30-inch planer and a 44-inch boring mill. The Browning Co. has sold a 25-ton locomotive crane to the National Plate Glass Co., Ottawa, Ill.

Sales Show Improvement

MILWAUKEE, Oct. 2.—Sales of metalworking machinery during September showed an increase over the August, but hardly enough to come up to the expectations of makers and dealers, who hoped that business would pick up to a greater extent after the summer lull. Similar hopes are held out for October trade, and inquiry during the latter part of the month just closed would seem to justify these views. New business has been developing in a rather hesitating way and runs irregularly. Shops are buying machinery only as needed to take care of current orders, and as a rule their plants are sufficient to handle this business, while the shortage of labor of the skilled kind is still such that it is hazardous to attempt enlargement. Used machinery is moving fairly well but the supply is plentiful.

Bulletin Board

Requests for Equipment and Supplies, Trade Literature, Etc., Made Through IRON TRADE REVIEW

Request has been made by Roku-Roku Shoten, whose head offices at Tokio were totally destroyed in the recent disaster, for complete catalogs and price lists to replace their files. This data should be sent to the branch office at Osaka, street number Enokojima Mishiku.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

East of the Mississippi River

HARTFORD, CONN.—The Hanson-Whitney Machine Co. has let the contract for a brick, 1-story, 50 x 80-foot factory addition.

NEW BRITAIN, CONN.—Landers, Frary & Clark has let the contract for a 1-story 80 x 166-foot factory to cost about $28,500.

SHELTON, CONN.—The Oakley Valve Co., Inc., has been incorporated with 500 shares of no par value stock by A. P. Holmes, C. F. Holmes and William H. Comley.

WESTPORT, CONN.—The Toquet Carburetor Co. has leased property in Bridgeport, Conn., and expects to move there in the near future, where it will manufacture automobile accessories.

ANNA, ILL.—Bids will be taken soon for the steel to be used in the erection of a cement plant here having an annual capacity of 1,000,000 barrels. Tests have been made and financial arrangements completed, according to A. A. Fasig, this city.

CHICAGO—Reliance Electric Co., 1313 Moorman street, will build a 2-story and basement factory adjoining its present site.

CHICAGO—G. F. Marchant & Co. will construct a 1-story, 114 x 122-foot machine shop addition at 1420 South Rockwell avenue.

CHICAGO—A 1-story, 25 x 100-foot addition will be built by William H. Vallas Jr., 4811 West Lake street, manufacturer of sheet metal work.

CHICAGO—J. D. Wallace Co., 1401 West Jackson boulevard, will construct a 1-story machine shop, 122 x 126 feet, at California and Adams streets.

CHICAGO—The Lyons Products Co., 213 West Austin avenue, was incorporated for $10,000 by Frank Mellish, Charles H. Touzalin and Eugene G. Melin, to manufacture heating devices.

CHICAGO—The Atlantic Electric Fixture Co., 308 South Clark street, was incorporated for $200 by D. W. Eliot, Charles M. Field and G. Litka to manufacture, buy, sell and trade in electrical supplies and appliances.

CHICAGO—The Consumers Steel Co. was incorporated for $1000 by Sonnenschein, Berkson, Lautman & Levinson, Chicago Temple building, to manufacture, buy and sell iron, steel, manganese, copper, etc.

CHICAGO—The Tin Plate Sales Corp., 3711 South Ashland avenue, was incorporated for $50,000 by William B. Davis, Frances V. Davis and Charles R. Boden, to manufacture, buy and sell tin plates and products.

CHICAGO—Beacon Utilities Co., Inc., Lakeside and Stanley streets was incorporated for $66,000 to deal in machinery and tools, etc., by Harold Beacon, P. V. Badgely, and M. B. Burgess.

CHICAGO—The Multistamp Distributing Co., 168 North Michigan avenue, was incorporated for $50,000 by L. F. Callahan, R. S. Rawlings and W. J. Stuart to manufacture and deal in metallic, rubber and wooden stamps.

CHICAGO—The Stokes Railway Equipment

More Than 54,000
Nearly 25 Per Cent Greater Than the Circulation of the Leading Evening Newspapers
NINETY-FIFTH YEAR.
THE POST-STANDARD
SYRACUSE, N. Y., SUNDAY MORNING, APRIL 15
Telegraph Editorial Sports New Phone Number—2-1431
SECTION 1
FINAL EDITION—PRICE EIGHT CENTS.
STEEL OUTPUT SETS RECORD
March Production Record for Country—Industry Shows No Signs of Any Weakness
CLEVELAND, Ohio, April 14.—Several weeks of quieter buying have developed no marks of weakness in iron and steel conditions, according to The Iron Trade Review. The tendency still is upward both in production and prices, though the latter are

The Post-Standard is a leading newspaper of Syracuse, N. Y., one of the largest manufacturing cities of the Empire State, the center of a large gear manufacturing industry. The Post-Standard devotes considerable space to industrial news.

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CLEVELAND

The international reputation and the World-wide circulation of the IRON TRADE REVIEW is the result of year after year of unfailing Editorial accuracy and reliability.

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THE IRON TRADE REVIEW

"The Most Widely Quoted Trade Paper In The World"

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	4.30c
New York	3.54c
Philadelphia	3.55c
Pittsburgh	3.15c
San Francisco	3.75c
Seattle	4.10c
St. Louis	3.35c
St. Paul	3.45c

IRON BARS

Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.55c
St. Louis	3.35c

SHAPES, STRUCTURAL

Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	4.40c
New York	3.64c
Philadelphia	3.65c
Pittsburgh	3.25c
San Francisco	3.60c
Seattle (large shapes)	4.20c
St. Louis	3.45c
St. Paul	3.55c

PLATES

Boston	3.615c
Boston 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	3.65c
New York	3.64c
Philadelphia	3.65c
Philadelphia, 3/16-inch	3.95c
Pittsburgh	3.25c
San Francisco	3.75c
Seattle	4.25c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.615c
Buffalo	4.45c
Chicago	4.35c
Cincinnati	4.10c
Cleveland	3.75c to 4.06c
Detroit	4.30c
Los Angeles	5.20c
New York	4.59c
Philadelphia	4.25c
San Francisco	5.25c
Seattle	5.00c
St. Louis	4.45c
St. Paul	4.60c

NO. 28 BLACK SHEETS

Boston	5.45c
Buffalo	5.25c
Chicago	5.20c
Cincinnati	4.90c
Cleveland	4.65c
Detroit	5.15c
Los Angeles	6.50c
New York	4.90c to 5.15c
Philadelphia	5.15c
San Francisco	5.80c
Seattle	6.00c
St. Louis	5.30c
St. Paul	5.45c

NO. 28 GALVANIZED SHEETS

Boston	6.60c
Buffalo	6.35c
Chicago	6.35c
Cincinnati	5.90c
Cleveland	5.60c to 5.80c
Detroit	6.30c
Los Angeles	7.30c
New York	5.95c to 6.15c
Philadelphia	6.25c
San Francisco	6.50c
Seattle	7.00c
St. Louis	6.45c

BANDS

Boston	4.80c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00c to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	5.20c
New York	4.39c
Philadelphia	4.35c
Pittsburgh	3.95c
San Francisco	4.50c
Seattle	5.10c
St. Paul	4.20c

HOOPS

Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider	
20 gage and heavier	4.75c
Pittsburgh	3.95c
Seattle	5.50c
St. Paul	4.80c

COLD ROLLED STEEL

Boston (rounds)	4.75c
Boston (shapes)	5.25c
Buffalo (rounds)	4.70c
Buffalo (shapes)	5.20c
Chicago (rounds)	4.55c
Chicago (shapes)	5.05c
Cincinnati (rounds)	4.50c
Cincinnati (shapes)	5.00c
Cleveland (rounds)	4.25c
Cleveland (shapes)	4.75c
Detroit (rounds)	4.55c
Detroit (shapes)	5.05c
Los Angles (rounds)	5.90c
New York (rounds)	4.65c
New York (shapes)	5.15c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
Pittsburgh	4.25c
San Francisco (rounds)	5.75c
Seattle (rounds)	6.00c
St. Paul (rounds)	4.55c

Co., 327 South La Salle street, was incorporated for $25,000 by G. S. Stokes, M. E. W. Stokes and J. D. Iroe to manufacture and deal in railway cars, equipment, etc.

CHICAGO—The Mogul Gear Co., 127 North Dearborn street, has been incorporated for $20,000 by Myer H. Gladstone, Lazar H. Gladstone and Anita Sloan, to buy, sell and deal in gears of all kinds.

CHICAGO—The Pohn Iron & Steel Co., 1864 LeClair avenue, has been incorporated for $50,000 by M. M. Willmer, M. H. Nierenberg and Mary Henry, to buy and sell iron, steel, etc.

CHICAGO—Edward Lasker Co., 5215 Cornell avenue, was incorporated with $10,000 capital and 300 shares no par value stock, by Edward Lasker, S. J. Blumenthal and John R. Little, to manufacture and deal in machinery. Mergentheim, Altheimer & Mayor, 10 South La Salle street, is correspondent.

CHICAGO—Maroon, Meyer & Co., Inc., 1319 South Michigan avenue, was incorporated for $40,000 by Harry Blitzsten, Benjamin E. Jaffe and D. H. Davis to manufacture and deal in radio equipment and apparatus, electrical supplies, etc. Dancona & Pflaum, 30 North La Salle street, is correspondent.

CHICAGO—The Superior Specialty Corp., 4317 North Western avenue, was incorporated for $20,000 by John W. Jones, W. L. Hanson, H. C. Seidel and John Berner to manufacture, buy, sell and deal in radiator caps, devices and equipment and automobile accessories. Sorem, Powers & Walters, 166 West Jackson boulevard, is correspondent.

WAUKEGAN, ILL.—The Bortner Mfg. Co., Chicago, manufacturer of plumbing fittings, has leased the building here formerly occupied by the Anhydrous Food Products Co., located at Stanley street and Lakeside avenue, North Chicago. Machinery is being installed.

West of the Mississippi

LITTLE ROCK, ARK.—About $75,000 will be spent for a new factory and machinery for the Arkansas Bauxite Products Co., box 381, recently organized to manufacture alum and kindred products.

VERNON, CAL.—Conveying, hoisting and other equipment will be required in the 1-story 300 x 400-foot distributing plant for the United States Steel Products Co., Los Angeles.

MARSHALLTOWN, IOWA—The Lennox Furniture Co. will commence building at once of a third unit to its factory in this city, to house a tin shop. It will be one and two stories, 72 x 144 feet.

BURLINGAME, KANS.—A $95,000 high school equipped for manual training will be erected soon. Bids for construction are to be asked shortly.

ST. PAUL, MINN.—A factory building will be erected by the Lane Oil Heat Mfg. Co., 111 Endicott arcade.

ST. LOUIS—General contract for a $100,000, 1-story, 130 x 260-foot addition has been let by the Fred Medart Mfg. Co., Second and Potomac streets, manufacturer of steel lockers and shelving.

WARRENSBURG, MO.—A $185,000 high school to be equipped with manual training equipment will be built here.

JACKSONVILLE, TEXAS—The Hall Foundry & Machine Co. was badly damaged by fire recently with a loss of approximately $50,000, with no insurance.

SEATTLE, WASH.—The Best Universal Lock Co. has been incorporated for $750,000 by William E. Froude and associates, Marion building.

Business in Canada

WINNIPEG, MAN.—Construction will start soon on a gas plant for the Winnipeg Electric Railway Co., costing about $1,000,000, to be equipped with the latest machinery available.

BRAMPTON, ONT.—The Beaver Truck Co., Hamilton, Ont., has secured a 5-acre site here and will erect two buildings at a cost of $150,000 for the manufacture of motor trucks, etc. One building will be 100x350 feet and the second 120x70 feet of steel and concrete construction.

CHATHAM, ONT.—T. R. Coulter, Ltd., has been incorporated for $40,000 by Andrew W. Hunter, John C. Thomson and Henry G.

(*Continued on Page* 986)

Bourne-Fuller Service

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THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
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CLEVELAND

New York **Chicago** **Detroit**
San Francisco
Cincinnati

Iron and Steel Production

Compiled By IRON TRADE REVIEW

Pig Iron

	-Stacks- No.	In	—Output— Total	Av. daily
1907				
January	376	311	2,174,801	70,155
February	374	308	2,047,036	73,109
March	377	304	2,186,709	70,539
April	378	327	2,226,708	74,223
May	391	329	2,291,030	73,904
June	392	341	2,237,420	74,580
July	396	335	2,253,243	72,685
August	397	329	2,243,656	72,376
September	399	329	2,174,148	72,471
October	401	314	2,359,690	76,119
November	398	226	1,820,558	60,685
December	398	154	1,234,733	39,830
Total			25,249,732	
1908				
January	398	139	1,081,813	34,897
February	401	150	1,086,809	37,476
March	398	154	1,229,856	39,672
April	398	146	1,155,122	38,504
May	396	145	1,168,002	37,677
June	395	154	1,106,300	36,876
July	397	166	1,228,604	39,632
August	399	181	1,366,019	44,065
September	399	189	1,416,252	47,208
October	400	200	1,573,824	50,764
November	402	212	1,582,314	52,744
December	403	221	1,723,664	55,602
Total			15,718,579	
1909				
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,201
October	413	309	2,589,681	83,538
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,325,099	
1910				
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,768
March	417	310	2,588,736	83,508
April	418	291	2,477,700	82,590
May	419	279	2,374,802	76,607
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,791	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,416
Total			26,845,902	
1911				
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,863
April	421	220	2,044,904	68,163
May	421	206	1,871,888	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	
1912				
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	
1913				
January	423	297	2,787,800	89,929
February	423	306	2,578,670	92,095
March	423	278	2,762,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,816,825	90,865
June	422	283	2,616,883	87,229
July	422	264	2,558,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,494,098	83,137
October	425	244	2,539,924	81,933
November	424	225	2,229,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	
1915				
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	357	3,238,970	104,483
September	431	342	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	
1918				
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,723
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	439	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,778
Total			38,437,488	
1919				
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,120
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,780	
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	
1921				
January	436	184	2,414,753	77,895
February	436	155	1,929,394	68,906
March	436	103	1,594,866	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,859
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	
1922				
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	241	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	
1923				
January	428	261	3,228,226	104,136
February	424	278	2,993,918	106,925
March	424	295	3,523,595	113,664
April	423	311	3,547,012	118,233
May	423	322	3,868,486	124,790
June	424	322	3,667,868	122,262
July	418	299	3,684,677	118,860
August	418	272	3,442,614	111,052

Ingots and Castings

By American Iron and Steel Institute

	Ingots	Castings	Total
1918	43,051,022	1,411,410	44,462,432
1919	33,694,795	976,437	34,671,232
1920	40,881,392	1,251,542	42,132,934
1921	19,184,084	559,713	19,743,797
1922	34,568,418	1,034,508	35,602,926

Monthly Ingot Output

Gross Tons

1922	84.15 per cent of capacity	Calculated total
January	1,593,482	1,891,857
February	1,745,022	2,071,772
March	2,370,751	2,814,667
April	2,444,513	2,902,240
May	2,711,141	3,218,794
June	2,634,477	3,127,775
July	2,487,104	2,952,806
August	2,214,582	2,629,256
September	2,373,779	2,818,261
October	2,872,415	3,410,265
November	2,889,297	3,430,309
December	2,779,890	3,300,416
Total	29,116,453	34,568,418
1923	95.35 per cent	
January	3,644,629	3,822,369
February	3,294,264	3,454,918
March	3,858,675	4,046,854
April	3,760,997	3,944,412
May	4,000,695	4,195,800
June	3,574,567	3,748,890
July	3,350,829	3,514,241
August	3,508,347	3,679,441

A Big Crane That is Easily Operated

You do not often find a large capacity crane that is easy to operate. The Brownhoist No. 6 crane however has not only been built to handle heavy loads but the operating details have also received an unusual amount of attention. With conveniently located levers to control the steam operated clutches this crane is as easy to operate as many machines of much smaller capacity.

The advantages of a big crane on many kinds of work need no explanation. The No. 6 Brownhoist not only handles a 30 to 40 ton load with ease but also enables you to use a longer boom, a bigger bucket or a larger magnet, as the job requires. Summed up, this means bigger output per day.

For companies having a large tonnage to handle we would highly recommend this crane and would like to tell you more about its money-saving possibilities.

Brownhoist Products

Locomotive Cranes
Concrete Bunkers
Dock Machinery
Chain Conveyors
Belt Conveyors
Bridge Cranes
Buckets, etc.

Literature on request

The Brown Hoisting Machinery Co., *Cleveland, Ohio*

Branch Offices: New York, Chicago, Pittsburgh, San Francisco, New Orleans

BROWNHOIST

MATERIAL HANDLING MACHINERY

Business in Canada

(Continued from Page 982)

Donely to manufacture and deal in automobiles, tractors, farm implements, etc.

CHESLEY, ONT.—The W. & C. Window Regulator Co. proposes to erect a plant here at a cost of $100,000 for the manufacture of a patent window regulator. R. J. Rainey, the manager, is negotiating for the purchase of equipment.

ELORA, ONT.—T. E. Bissell Co., manufacturer of agricultural implements, etc., is building an addition to its plant and is asking for equipment.

OTTAWA, ONT.—Plans have been completed and work will start immediately on the construction of power development plant at Bryson, about 50 miles above Ottawa, for the Ottawa River Power Co., subsidiary of the Ottawa & Hull Power Co. It is stated that the first unit will be capable of developing 25,000 horsepower.

OTTAWA, ONT.—The McMullen-Perkins Co. is building a machine shop costing approximately $7000 and is in the market for machinery.

TORONTO, ONT.—Construction is under

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range bessemer, 55 per cent iron	$6.45
Mesabi bessemer, 55 per cent iron	6.20
Old Range nonbessemer, 51½ per cent iron	5.70
Mesabi nonbessemer, 51½ per cent iron	5.55

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 65 per cent	10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent	13.25 to 16.50

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent	9.00 to 10.50
Algerian low phosphorus, 52 to 54 per cent	10.00 to 11.00
Swedish and Norwegian low phosphorus, 68 per cent	nominal
Swedish foundry or basic, 66 to 68 per cent	10.50 to 10.75
Spanish foundry or basic, 50 to 54 per cent	8.00 to 9.50

Manganese Ore

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent	nominal
Indian, minimum 47 per cent	(nominal) 40 to 42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent	43¾ cents c.i.f. tidewater

Fluor Spar

85 and 5% grade

Washed gravel, Kentucky and Illinois mines, per net ton	$20.00 to $23.50
Washed gravel, imported, duty paid eastern tidewater, per net ton	$19.60 to 20.00

Rivets

Structural rivets, Pittsburgh	2.90c to 3.10c
Rivets, 7/16-in. and smaller	65 and 10 to 65 and 5 off

Nuts and Bolts

NUTS
(Up to 1¼ and 1½ inches inclusive)

Hot pressed square or hexagon blank	$4.00 off list
Hot pressed square or hexagon tapped	$4.00 off list
Cold punched square or hexagon blank	3.75 off list
Cold punched, square or hexagon,	3.75 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger	75 and 5 off
Cold punched semifinished hexagon nuts 9/16-inch and smaller	80 and 5 off

Price f.o.b. Pittsburgh, Packages of 50.

CARRIAGE BOLTS
(¾ x 6 inches, smaller and shorter)

Rolled thread	60 and 5 off
Cut thread	50, 10 and 5 off
Larger and longer	50, 10 and 5 off

MACHINE BOLTS
(¾ x 4 inches, hot pressed nuts)

Rolled thread	60.10 and 5 off
Cut thread	60 and 5 off
Larger and longer	60 and 5 off

(¾ x 4 inches, cold punched nuts)

Cut thread	50, 10 and 5 off
Larger and longer	50, 10 and 5 off
Lag screws	65 and 5 off
Plow bolts Nos. 1, 2 and 3 heads	50 and 10 off
4 to 10 heads	50-10 + 20 off
Stove bolts	75, 10 and 5 off
Tap bolts	25 and 10 off
Bolt ends with hot pressed nuts	60 and 5 off
Bolt ends with cold punched nuts	45, 10 and 5 off
Blank bolts	60 and 5 off
Rough stud bolts with nuts	50, 10 and 5 off

WASHERS

Wrought washers	$5.00 off

Steel Pipe

(Effective April 19, 1923)
Pittsburgh basing discounts, jobbers' carloads.

	Black	Galvanized
Butt Weld		
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½
Lap Weld		
2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	60	48½
Lap Weld		
2-inch	53	41½
2½ to 6-inch	57	45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½
Lap Weld		
2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½
Lap Weld		
2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	38	25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)
Pittsburgh basing discounts, jobbers, carloads

	Black	Galvanized
THREADS AND COUPLINGS		
Butt Weld		
¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11
PLUGGED AND REAMED		
Two points less than above		
EXTRA STRONG, PLAIN ENDS		
Butt Weld		
¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	..

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)
(Effective April 19, 1923)

2 and 2¼-inch	23 off
2½ and 2¾-inch	33 off
3-inch	36 off
3½ to 3¾-inch	38½ off
4 to 13-inch	42 off

CHARCOAL IRON
(Effective April 12, 1923)

1½-inch	+22
1¾-inch	+12
2 and 2¼-inch	+ 2
2½ to 3-inch	3
3¼ to 4½-inch	5

SEAMLESS COLD DRAWN
(Effective April 19, 1923)

1-inch	51 off
1¼ and 1½-inch	43 off
1¾-inch	27 off
2 and 2¼-inch	18 off
2½ and 2¾-inch	28 off
3 and 3¼-inch	32 off
3½ and 3¾-inch	33 off
4-inch	37 off
4½ and 5-inch	29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch	34 off
3½ and 3¾-inch	35 off
4-inch	39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts

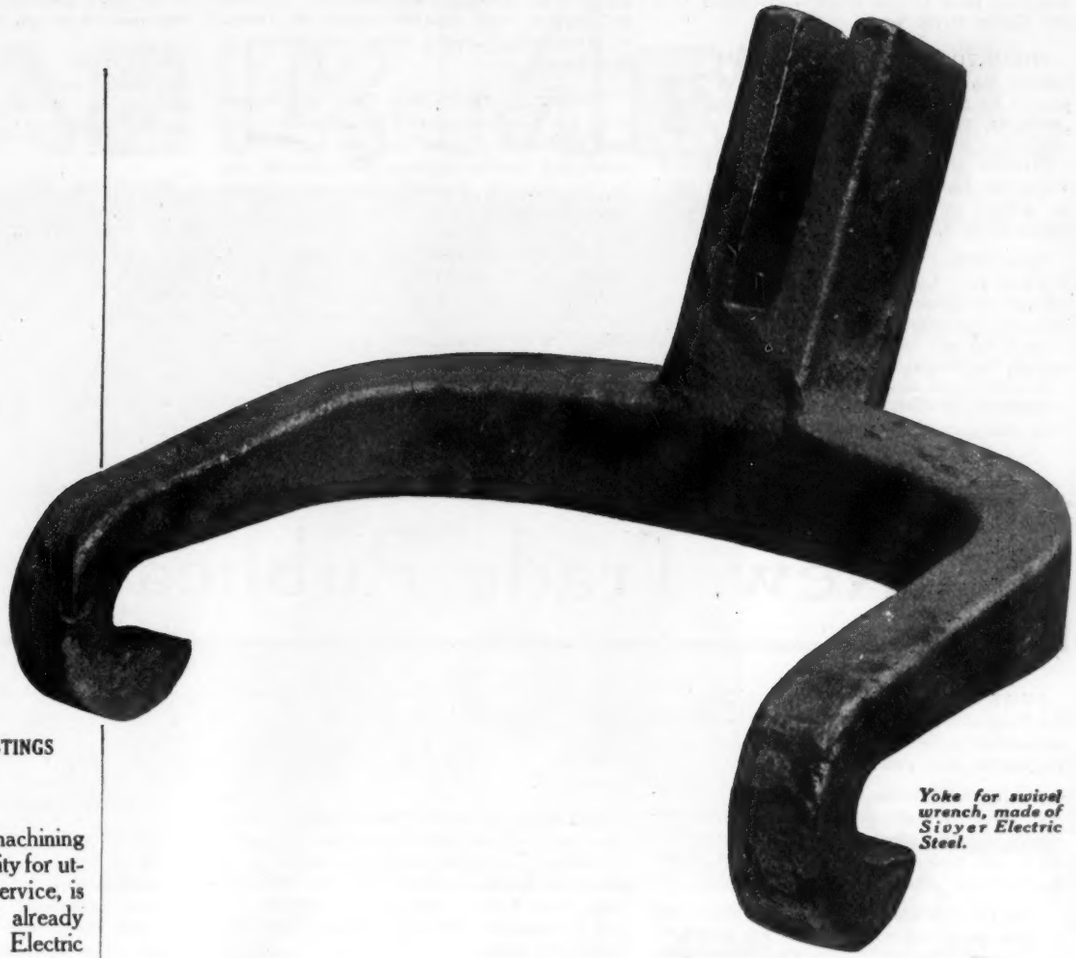
Carbon, 0.10 to 0.20 per cent	83 off
Carbon, 0.30 to 0.40 per cent	81 off
Carbon, 0.40 to 0.50 per cent	net price

Plus differentials and extras for cutting

SEAMLESS STEEL LOCOMOTIVE AND SUPER-HEATER TUBES
(Effective April 19, 1923)

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5⅜-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.



Yoke for swivel wrench, made of Sivyer Electric Steel.

Replacing hammered forgings

GREAT strength and absolute soundness are the primary requisites for metal parts such as swivel wrenches. Because of their design, parts like the yoke have to be hammer forged or cast. In certain designs the hammer forging necessitates hot welding which may develop weakness in service. Manufacturers of machinery and tools, specializing in absolutely dependable equipment, are now having such parts cast in Sivyer Electric Steel. Its honest surfaces, trueness to pattern, and interior integrity provide the flawless quality and unfailing strength that men in the field demand.

SIVYER (S) CASTINGS

DEPENDABLE

The need for better machining qualities, and the necessity for utmost dependability in service, is rapidly extending the already wide use of Sivyer Electric Steel Castings.

Freedom from surface defects and from hidden interior flaws is assured by the same thorough molding practice that makes Sivyer Castings so uniformly true to pattern. Exceptional strength is provided by electric furnace metal produced according to the Sivyer standards of melting practice, analysis and control.

Send blue prints

We are especially interested in making experimental castings for manufacturers who are having trouble with hammered forgings. If you will send us your blue prints for such parts, together with a statement of your difficulties, we will study the problems involved and recommend possible solutions without obligation on your part.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

way on a plant for the Penarith Machinery Co., 970 Queen street west.

TORONTO, ONT.—The MacDonald Engineering Co. of Canada, Ltd., has been incorporated for $5000 by Harold I. Hellmuth, Richard L. D. Taylor and Lyle Ramsay.

TORONTO, ONT.—The Dominion Wheel & Foundries, Ltd., 131 Eastern avenue, will build an addition to its plant and bids are being received by S. J. Neil, manager.

TORONTO, ONT.—The Wayne Forge & Machine Co., Ltd., has been incorporated for $100,000 to manufacture industrial and domestic heating appliances, castings and general machinery, by William S. Watson, Henry E. G. Watson and George McLeish.

TORONTO, ONT.—A. G. Adams, Ltd., has been incorporated to manufacture and deal in piston rings, automobile and electrical equipment and supplies, with $100,000 capital, by Dougal P. McDougall, Margaret Oliver and Richard G. McClelland.

TORONTO, ONT.—The Pneu Oil Burners Ltd., has been incorporated to manufacture and deal in hot air, steam, gas and oil furnaces, stoves and heating apparatus with $40,000 capital by John R. Rumball, Lawrence A. Landriau and Enoch G. P. Dean.

TORONTO, ONT.—Walter M. Graham, Ltd., has been incorporated to manufacture and deal in mill, mining and railway supplies, and equipment, etc., with $40,000 capital stock; by Thomas H. Barton, James Cowan, James W. Gilroy and others.

WINDSOR, ONT.—The Canadian Roofing Co. is making arrangements for the rebuilding of its plant recently damaged by fire. Equipment will be bought for the new plant.

WINDSOR, ONT.—The Universal Wheel Co., Ltd., has leased the building formerly occupied by the Universal Button Co. here and will equip it to manufacture disk wheels for automobiles, etc.

WINDSOR, ONT.—The Deslauriers Metal Products Co. of Canada, Ltd., has been incorporated to manufacture metal forms for concrete works castings, etc., with $50,000 capital stock; by Arthur Deslauriers, St. Paul, Minn.; Alice D. Nadeau, Chicago, Ill.; Alfred M. Deslauriers, Detroit, Mich., and others.

MONTREAL, QUE.—The E. B. Myers, Ltd., will purchase machinery for the manufacture of radio equipment, etc. F. Callaghan, 222 St. James street, is negotiating for the purchase.

New Trade Publications

SHOT BLASTING—A folder published by the Pangborn Corp., Hagerstown, Md., contains information concerning dustless sandblasting by the use of steel grit and shot.

MACHINERY—An 8-page folder listing various pieces of machinery, such as boring machines, shapers, lathes, etc., has been issued by the E. L. Essley Machinery Co., West Washington Blvd., Chicago.

POWER HAMMERS—A small folder describing power hammers recently was issued by the Central Machine Works Co., Minneapolis. Features of construction, operation, lubrication, etc., are pointed out.

ELECTRIC HOISTS—The Detroit Hoist & Machine Co., Detroit, has issued a 25-page catalog devoted to hoists, monorails, cranes and winches. Illustrations show the applications of these hoists to the various fields of industry.

BOILER FEED REGULATORS—A 20-page catalog recently was issued by the Northern Equipment Co., Erie, Pa. It contains a description of a boiler feed regulator and several flow charts, and illustrations of valves and regulators.

LUBRICATING DEVICES—Sight feed, snap lever, slide and screw top oilers, and grease cups are illustrated in a folder issued recently by the Penberthy Injector Co., Detroit. Specifications and other descriptive matter is included.

TOOL GRINDER—Operative units of a special tool grinder are described in an illustrated folder published by the Oliver Machinery Co., Grand Rapids, Mich. The units comprise two oilstone wheels, one emery wheel, one emery cone, and one leather stropping wheel.

AIR COMPRESSORS—The various parts of a straight line air compressor are illustrated and described in a bulletin by the Sullivan Machinery Co., Chicago. Lubrication and construction details and table of dimensions, indicated horsepower, etc., are included.

PNEUMATIC RAMMERS—Applications of pneumatic rammers to the manufacture of concrete building blocks and other articles such as sewer covers, chimney caps, window sills, curbing, etc., are pointed out in a folder issued by the Chicago Pneumatic Tool Co., New York.

FLUE GAS SAMPLING—A sampling line for flue gas analysis, carbon dioxide recorders and devices which remove soot, moisture and sulphur from the line, are illusctrated and their principles pointed out in a bulletin published by the Uehling Instrument Co., Paterson, N. J.

OPTICAL PYROMETERS—Optical pyrometers are discussed and their operating principles described in a 15-page catalog published by the American Kreuger & Toll Corp., 522 Fifth avenue, New York. Considerable technical data and a correction table for deviation from black bodies are given.

CONTROLLER VALVES—Information regarding controller valves for air and oil, air and gas, and air, gas, water and steam is included in a bulletin published recently by the Bristol Co., Waterbury, Conn. Descriptive matter concerning temperature controllers and recording pyrometers also is given.

DRILLING MACHINERY—The Sullivan Machinery Co., Chicago, has issued two catalogs which pertain to air and steam drills and drill sharpeners. Rotator and auger drills and shanking tools are illustrated and described. Considerable attention also is given to sharpeners for hammer forging drill bits and shanks.

FLEXIBLE COUPLINGS—Couplings which compensate for parallel misalignment are described in a pamphlet recently issued by the Thomas Flexible Coupling Co., Warren, Pa. Several reproductions of blue prints with diagrams of couplings and tabulated data are included.

INDUSTRIAL SERVICE—The Material Handling Advisory Bureau, 10 South LaSalle street, Chicago, has issued a folder which points out possibilities of saving in the handling of material. It deals with equipment and the layout best adapted for efficient handling of raw or finished products in storage, shipment or in production.

LOCOMOTIVE HOIST—The Whiting Corp., Harvey, Ill., has issued an illustrated folder showing applications of four and six-jack locomotive hoists, traveling and gantry cranes, and a transfer table. An estimate of time and labor required to wheel and unwheel a locomotive by means of jack hoists is given.

MECHANICAL STOKERS—The Stoker Manufacturers association, Philadelphia, has issued a small booklet describing the uses of mechanical stokers, their efficiency and range of application. The association also has published a condensed catalog describing mechanical stokers of every type and size for meeting fuel and plant load requirements.

ACCOUNTING FORMS—Two circulars devoted to forms, binders and other bookkeeping equipment used in connection with accounting recently have been issued by the Accounting Systems Corp., 605 Renshaw building, Pittsburgh. The equipment described is manufactured by the Accounting Devices Co., Chicago. Expansion binders, posting stands, work desks, visible record systems, etc., are described.

ELECTRIC FURNACES—Data pertaining to features, design, parts, operation, service, etc., of electric furnaces are given in a comprehensive illustrated catalog published by the Pittsburgh Electric Furnace Corp., Pittsburgh. Information is given regarding calculation of furnace size for a desired output and photographs show furnaces in use, charging devices, control boards, etc.

BRUSHES—Motor and generator brushes are described in a folder issued by the United States Graphite Co., Saginaw, Mich. A table of brush characteristics shows the specific resistance, carrying capacity in amperes per square inch, permissable peripheral speed, scleroscope hardness, transverse breaking strength, contact drop in volts and coefficient of friction for various grades of brushes.

HEAVY DUTY MOTORS—The Reliance Electric & Engineering Co., Cleveland, has published a 32-page illustrated catalog in which the various stages in the construction of a heavy duty direct current motor are described. Sub assemblies such as fields, armature, etc., are shown separately. Several diagrams are presented to illustrate the various parts of the motor, and tables give ratings and dimensions.

ANNEALING FURNACES—Rotary and regenerative car type electric annealing furnaces are illustrated and their important characteristics pointed out in two folders which are being distributed by the George J. Hagan Co.. Pittsburgh. Application of the rotary furnace to the manufacture of automobile parts is discussed in one of the bulletins. Construction of the car type furnace is shown by means of a diagram and photographs.

WABIK METAL

This view shows workmen shoveling dolomite on the banks of the furnace—just one of the many necessary processes in the production of *"Mansfield" Products.*

SHEET BARS INGOTS

VITREOUS ENAMELING

STOVE DOOR PANELS: SPLASHER BACKS: BROILER PANS: TABLE TOPS: REFRIGERATORS: SIGNS: and other flat work.

WABIK METAL SHEETS, like all other "Mansfield" Products, are rolled from our own *"Bottom-Poured"* Ingots.

They are very low in sulphur.

Other Specialties:

AUTOMOBILE SHEETS

Body Stock; Flat Fender and Hood Stock; Cowl Stock; Radiator Casing Stock; Crown Fender Stock.

METAL FURNITURE SHEETS
PICKLED and ANNEALED
ENAMELING STOCK
For Kitchen Utensils
MILK CAN STOCK

"Mansfield" Steel is the ultimate in Sheet Bars and in Sheets. It means satisfaction to the many users. Constant study of the needs of users, and continuous application of the results of such study, in the way of improved methods in our plants has established a reputation for reliability unsurpassed.

SHEET BARS
INGOTS

MANSFIELD SHEET & TIN PLATE COMPANY

MANSFIELD, OHIO

DISTRICT SALES REPRESENTATIVES

The L. D. Rockwell Co. No. 2 Rector St., New York, N. Y
Mr. D. B. Coey, 1018 Standard Oil Building, Chicago, Ill.
Mr. Geo. W. House, 1822 Ford Building, Detroit, Mich.
The L. D. Rockwell Co., 1201 National Bank Building, Cleveland, Ohio.
Mr. Edwin Schofield, 45 Jarvis St., Toronto, Ont., Canada.
Walter G. Clark, Inc., 106 N. Third St., St. Louis, Mo.
Walter G. Clark, Inc., 313 American Bank Bldg., Kansas City, Mo.
Mr. C. H. Beach, 617 Merchants Bank Bldg., Indianapolis, Ind.
Mr. A. P. Grenier, 640 Endicott Bldg., St. Paul, Minn.
Mr. Herbert P. Hill, 401 Continental Trust Bldg., Washington, D. C.
Wm. P. Horn Co., 237 Rialto Bldg., San Francisco, Cal.
Wm. P. Horn Co., 301 Kerchoff Bldg., Los Angeles, Cal.
Wm. P. Horn Co., Dekum Building, Portland, Ore.
Wm. P. Horn Co., 1426 L. C. Smith Bldg., Seattle, Wash.

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	14.00 to 15.00
Boston (dealers)	12.00 to 12.50
Buffalo	17.00 to 17.50
Chicago	15.00 to 15.50
Cleveland	15.50 to 15.75
Cincinnati	13.50 to 14.00
Detroit (dealers)	13.50 to 14.00
Eastern Pennsylvania	16.25 to 16.75
New York (dealers	12.00 to 12.50
Pittsburgh (dealers)	16.50 to 17.00
St. Louis	16.00 to 16.50
Valleys (nominal)	16.50
No. 1 railroad steel New York (dealers)	12.75 to 13.25

BUNDLED SHEETS

Buffalo	$15.00 to 15.50
Cleveland	11.75 to 12.25
Cincinnati	11.00 to 11.50
Detroit	9.50 to 10.00
Eastern Pennsylvania	13.00 to 14.00
Pittsburgh	14.00 to 14.50
St. Louis	8.50 to 9.00
Valleys	11.00 to 11.50

STEEL RAILS, SHORT

Birmingham	16.00 to 17.00
Boston (dealers)	12.00 to 12.50
Chicago	19.00 to 19.50
Cincinnati	19.00 to 19.50
Cleveland	15.00 to 15.25
St. Louis	17.75 to 18.25

STOVE PLATE

Birmingham	15.50 to 16.50
Boston (consumers)	17.00 to 17.50
Buffalo	17.00 to 17.50
Chicago	18.50 to 19.00
Cincinnati (net ton)	10.50 to 11.00
Cleveland	16.00 to 16.50
Detroit (net ton) (dealers)	10.50 to 11.00
Eastern Pennsylvania	17.00 to 18.00
New York (dealers)	14.00 to 14.50
Pittsburgh	15.00 to 15.50
St. Louis	15.50 to 16.00

LOW PHOSPHORUS

Buffalo	22.00 to 23.00
Cincinnati	15.00 to 15.50
Eastern Pennsylvania	22.50 to 23.00
Pitts. billets and bloom crops	23.50 to 24.00

SHOVELING STEEL

Chicago	14.75 to 15.25
Pittsburgh	14.00 to 14.50
St. Louis	16.00 to 16.50

KNUCKLES, COUPLERS & SPRINGS

Chicago	20.50 to 21.00
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh	21.00 to 21.50
St. Louis	19.00 to 19.50

COMPRESSED SHEETS

Buffalo	15.00 to 15.50
Chicago	11.50 to 12.00
Cleveland	13.75 to 14.00
Detroit (dealers)	12.50 to 13.00
Pittsburgh	15.00 to 15.50
Valleys	14.50

FROGS, SWITCHES, GUARDS

Chicago	15.00 to 15.50
Eastern Pennsylvania	16.00 to 16.50
St. Louis	17.00 to 17.50

BOILER PLATE, CUT

St. Louis	11.50 to 12.00

ANGLE BARS—STEEL

Chicago	17.00 to 17.50
St. Louis	17.00 to 17.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	15.00 to 16.00
Boston (dealers)	14.00 to 14.50
Buffalo	15.00 to 16.00
Cleveland, No. 1	13.00 to 13.50
Chicago, No. 1	16.25 to 16.75
Chicago, No. 2	15.50 to 16.00
Cincinnati, No. 1	12.50 to 13.00
Detroit, No. 2	13.50 to 14.00
Eastern Pennsylvania	18.00 to 19.00
Pittsburgh, No. 1	15.00 to 15.50
Pittsburgh, No. 2	16.50 to 17.00
New York, No. 1 (dealers)	15.50 to 16.50
St. Louis, No. 1	16.25 to 16.75
St. Louis, No. 2	16.00 to 16.50

WROUGHT PIPE

Boston (dealers)	11.50 to 12.00
Buffalo	12.00 to 12.50
Eastern Pennsylvania	16.00 to 16.50
New York (dealers)	11.25 to 11.75

YARD WROUGHT

Boston	12.50 to 13.00
Eastern Pennsylvania	15.00 to 16.00

CITY WROUGHT

New York, long	14.50 to 15.00

BUSHELING

Buffalo, No. 1	15.50 to 16.00
Chicago, No. 1	13.25 to 13.75
Chicago, No. 2	9.50 to 10.00
Cincinnati, No. 1	11.50 to 12.00
Cleveland, No. 1	12.00 to 12.25
Cleveland, No. 2	9.00 to 10.00
Detroit, No. 1	11.50 to 12.00
Detroit, No. 2 (new)	10.50 to 11.00
Detroit, No. 2 (old)	9.00 to 9.50
Eastern Pennsylvania	15.00 to 17.00
Pittsburgh, No. 1	15.50 to 16.00
St. Louis No. 1	15.00 to 15.50

MACHINE SHOP TURNINGS

Birmingham	7.00 to 8.00
Boston (dealers)	8.50 to 9.00
Buffalo	9.50 to 10.00
Chicago	8.50 to 9.00
Cleveland	12.00 to 12.25
Cincinnati	9.00 to 9.50
Detroit (dealers)	10.50 to 11.00
Eastern Pennsylvania	13.00 to 14.00
New York (dealers)	11.00 to 11.50
Pittsburgh	12.50 to 13.00
St. Louis	9.00 to 9.50
Valleys	11.00

CAST IRON BORINGS

Birmingham (chemical)	18.00 to 19.00
Birmingham (plain)	8.00 to 8.50
Boston (chemical)	12.50 to 13.00
Boston (dealers)	10.00 to 10.50
Buffalo	14.00 to 14.50
Pittsburgh	14.50 to 15.00
Chicago	11.00 to 11.50
Cincinnati	9.50 to 10.00
Cleveland	12.50 to 13.00
Detroit (dealers)	11.00 to 11.50
Eastern Pennsylvania	14.50 to 15.00
Eastern Pennsylvania (chem.)	17.00 to 18.00
New York (dealers' price)	11.50 to 12.00
St. Louis	12.50 to 13.00
Valleys	13.25 to 13.50

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	8.50 to 9.00
Cleveland	12.00 to 12.25
Detroit (dealers)	10.50 to 11.00
Eastern Pennsylvania	12.50 to 13.00
New York (dealers)	10.00 to 10.50

IRON AXLES

Birmingham	23.00 to 24.00
Boston (consumers)	31.00 to 32.00
Buffalo	28.00
Chicago	28.75 to 29.25
Cincinnati	24.00 to 24.50
Eastern Pennsylvania	30.00 to 33.00
New York (dealers)	27.00 to 28.00
St. Louis	27.00 to 27.50

IRON RAILS

Buffalo	20.00 to 21.00
Chicago	20.50 to 21.00
Cincinnati	14.50 to 15.00
St. Louis	16.00 to 16.50

PIPES AND FLUES

Chicago	10.25 to 10.75
Cincinnati	9.00 to 9.50
Cleveland	9.50 to 10.00
St. Louis	10.50 to 11.00

RAILROAD GRATE BARS

Buffalo	17.00 to 17.50
Chicago	16.00 to 16.50
Cleveland	16.00 to 16.50
Eastern Pennsylvania	17.00 to 18.00
New York (dealers)	14.00 to 14.50
St. Louis	14.00 to 14.50

FORGE FLASHINGS

Boston (dealers)	9.50 to 10.00
Chicago, small	11.00 to 11.50
Cleveland, small	11.75 to 12.00
Cleveland, large	11.75 to 12.00
Detroit (dealers)	11.00 to 11.50

FORGE SCRAP

Boston (dealers)	9.00 to 9.50
Chicago	15.50 to 16.00
Eastern Pennsylvania	13.50 to 14.50

ARCH BARS AND TRANSOMS

Chicago	22.50 to 23.00
St. Louis	22.50 to 23.00

ANGLE BARS—IRON

Chicago	22.50 to 23.00
St. Louis	24.00 to 24.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	9.50 to 10.00
Buffalo	15.00 to 16.00
Chicago	12.00 to 12.50
Cleveland	15.00 to 15.25
Eastern Pennsylvania	14.00 to 16.00
Pittsburgh	14.50 to 15.00
St. Louis	13.00 to 13.50

STEEL CAR AXLES

Birmingham	19.00 to 20.00
Boston (consumers)	22.00 to 23.00
Buffalo	19.00 to 20.00
Chicago	18.50 to 19.00
Cleveland	21.00 to 21.50
Eastern Pennsylvania	20.00 to 22.00
New York (dealers)	nominal
Pittsburgh	21.00 to 21.50
Lt. Louis	20.00 to 20.50

SHAFTING

Boston (consumers)	22.00 to 23.00
Chicago	22.50 to 23.00
Eastern Pennsylvania	20.00 to 23.00
New York (dealers)	16.00 to 17.00
St. Louis	21.00 to 21.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	18.00 to 19.00
Birmingham, iron	17.50 to 18.00
Boston (consumers)	22.00 to 23.00
Buffalo, iron	16.50 to 17.50
Chicago, iron	19.00 to 19.50
Cincinnati	14.00 to 14.50
Eastern Pennsylvania	20.00 to 21.00
New York iron (dealers)	16.00 to 17.00
Pittsburgh, iron	18.50 to 19.00
Pittsburgh steel	21.00 to 21.50
St. Louis, iron	18.50 to 19.00

NO. 1 CAST SCRAP

Birmingham, cupola	19.00 to 20.00
Boston (consumers)	22.50 to 23.00
Buffalo	19.50 to 20.50
Chicago, cupola	20.00 to 21.00
Cincinnati No. 1 machinery cupola (net tons)	19.50 to 20.00
Cleveland, cupola	21.50 to 22.00
Detroit (net ton) (dealers)	20.00 to 20.50
Eastern Pennsylvania, cupola	20.00 to 21.00
New York, cupola (dealers)	17.00 to 17.50
Pittsburgh, cupola	21.00 to 21.50
San Francisco	28.00
St. Louis, railroad	20.50 to 21.00
St. Louis, agricultural	20.50 to 21.00
Valleys	19.50 to 20.00

HEAVY CAST

Boston (consumers)	20.00 to 21.00
Buffalo	16.00 to 17.00
Cleveland	14.00 to 14.25
Detroit (automobile) (net ton)	22.00 to 22.50
Eastern Pennsylvania	18.00 to 19.00
New York (dealers)	16.00 to 16.50
Pittsburgh	17.00 to 17.50

MALLEABLE

Boston (railroad) (consumers)	22.00 to 23.00
Buffalo	20.00 to 21.00
Chicago, railroad	20.75 to 21.25
Chicago, agricultural	19.00 to 19.50
Cincinnati, agricultural	16.00 to 16.50
Cincinnati, railroad	16.50 to 17.00
Cleveland, agricultural	21.00 to 21.50
Cleveland, railroad	21.00 to 21.50
Detroit (dealers)	19.50 to 20.00
Eastern Pennsylvania, railroad	17.00 to 17.50
Pittsburgh, railroad	20.50 to 21.00
St. Louis, agricultural	18.00 to 18.50
St. Louis, railroad	18.00 to 18.50

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	17.00 to 17.50
Boston (dealers)	14.00 to 14.50
Chicago	17.00 to 17.50
Cleveland	19.00 to 19.25
Detroit	13.50 to 14.00
Eastern Pennsylvania	19.00 to 19.50
New York (dealers)	15.00 to 15.50
Pittsburgh district	18.50 to 19.00
St. Louis	17.00 to 17.50

LOCOMOTIVE TIRES

Chicago	17.25 to 17.75
St. Louis	17.00 to 17.50

LOW PHOSPHORUS PUNCHINGS

Chicago	17.00 to 17.50
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh	21.00 to 21.50